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ABSTRACT

The first phase of a study into language learning examined six undergraduate students' building of disciplinary discourse knowledge as they became immersed in the disciplinary community of psychology. Students were followed over the entire 4-year course of their undergraduate careers. Data included interviews, questionnaires, papers the students wrote, and maps they drew of the discipline of psychology throughout the 4 years (and into a 5th year). Results indicated that all of the subjects made changes (some gradual and some dramatic) in their representations of the discipline. In the bodies of work of some subjects were signs of an emerging authorship--signs that the writer was creating a body of work interconnected through thematic links and connected with a community of scholars pursuing similar work. The second phase provided converging information for the 5-year-long longitudinal study. Nine professors, 10 first-year students, 10 third-year students, and 12 graduate students from the Department of Psychology at Carnegie Mellon University completed questionnaires designed to elicit their descriptions of the discipline of psychology, the roles writing and authoring play in the discipline, and their experiences with authoring in the discipline. Results indicated that as students became more steeped in the discipline, they became more attuned to the various kinds of discourse that operated within the discipline; and the students learned the discipline through a long apprenticeship. (Eleven tables and 10 figures of data are included; questionnaires are attached. Contains 55 references.) (RS)

FINAL REPORT

WRITING FROM ACADEMIC SOURCES

Study 1
Acquiring Discourse Knowledge for Writing and Learning

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Acquiring Discourse Knowledge for Writing and Learning
Study 1. Development of Discourse Knowledge:
Phase 1. Longitudinal Phase

Language learning can be a lifelong process as people experience new forms of discourse and attempt to produce those forms themselves. One important kind of language development for many people occurs when they begin to learn the specialized discourse of their chosen profession or vocation as they pursue college studies in their academic major. To a beginner, the discourse of an academic discipline often seems strange, sometimes incomprehensible, with its specialized vocabulary, its distinctive forms, genres, and stylistic features, and its conventionalized practices, such as particular ways of asserting and supporting claims (McCarthy, 1987). To facilitate the learning of the discourse as well as the content of a discipline, instructors often give students assignments to read disciplinary texts and to write texts that have some similarity to those produced by people working in the discipline. This relationship between writing and knowing is, of course, one of the rationales for *writing across the curriculum.*

The discipline chosen for the major (and possible career) can be thought of as a social group, or community, that the student seeks to join. It is a *discourse* community: a group whose members share assumptions about "what objects are appropriate for examination and discussion, what operating functions are performed on those objects, what constitutes 'evidence' and 'validity,' and what formal conventions are followed" in the discourse (Porter, 1986, pp. 38-39). Within the large disciplinary community are smaller communities that are defined by more specialized interests and that operate under their own shared assumptions.

Authorship is a major function of a disciplinary community. The discipline and the smaller communities within it have forums (journals, conferences) for sharing authored products, have procedures and criteria for publication, and regulate their own discourse through peer review. Status in a disciplinary community is tied, to a great extent, to establishment of an *authoring identity*---an identity that is constructed intertextually. One becomes known as an author--an authority on particular topics or issues-- through publishing an interrelated set of texts, establishing intertextual links with related work of others through citations, and having one's own texts cited by others (cf. Cronin, 1984).

The first phase of our study into language-learning was a longitudinal inquiry with students who at the outset were inexperienced--one might even say *illiterate* --in the discourse of their chosen discipline, psychology, even though by many measures they were quite proficient in a more general kind of academic English. At the end of the four years, even after completing their set of required courses and electives and receiving their bachelor's degrees, they still would not be fluent in the discourse. They would by no means have command of the specialized discourse that Gee (1989) describes as an'identity kit"--the "saying-(writing)-doing-being-valuing-believing combination" (p. 178) that marks one as a community member. They would not be full-fledged community members, but they would have begun to construct their identities as future psychologists. They would not be authors in the discipline, but they would have produced a body a work--a number of "psychology papers" for their classes.

Other studies have given some attention to developmental patterns as students learn the discourse of their disciplines, though most of these studies have

focused on the graduate years. Berkenkotter, Huckin, and Ackerman (1988) reported a case study covering one year in a graduate program. They followed one graduate student through his first year in a research-oriented doctoral program in rhetoric and traced changes in his use of discourse features in the papers he produced for his courses. An increase in syntactic complexity and decrease in use of the personal pronoun "I," for example, marked his writing as becoming more appropriate for scholarly writing in his field. In several studies taking a cross-sectional instead of longitudinal approach, undergraduates have been included, but they have served as a point of comparison for the superior facility that persons more advanced in the discipline--graduate students--have with the discourse. For instance, graduate nursing students have performed more successfully on an abstract-writing task (received higher holistic scores) than undergraduates in that field (Joliffe & Brier, 1988), and graduate students in education have written better discussions for an unfinished research article (made more use of data from the study) than undergraduates in that field (Hare & Fitzsimmons, 1988). Research attention has not gone to the development of disciplinary discourse knowledge *across* the undergraduate years, although there is some work documenting the difficulties that undergraduates can have with the specialized discourse of academic disciplines (e.g., Faigley & Hansen, 1985; McCarthy, 1987).

Our longitudinal study with undergraduates examined their building of disciplinary discourse knowledge as they became more immersed in the disciplinary community and began to establish possible places within it. We looked at undergraduates' constructions of possible identities within their disciplinary communities and also the authoring identities suggested by their cumulative bodies of work. Instead of focusing on specific text features as markers of conventionalization, as has been done in previous work, we were most interested in *intertextual* features. Our interest was in authorship--to what extent a person was beginning to operate as a disciplinary author in establishing an interrelated body of work and establishing ties with other authors. There might be signs of *emergent authorship*--early signs that these individuals, even as undergraduates, were beginning to operate, to some extent, like disciplinary authors.

To capture patterns over time as students dealt with the specialized discourse of their discipline, our inquiry entered the process early--in the freshman year---and continued over the course of students' entire undergraduate careers, following them for four years and seeing them all through graduation. The study was limited to six students in a single discipline, psychology, in one academic setting, Carnegie Mellon University--a university and a psychology department where authorship on the part of faculty is highly valued. Carnegie Mellon's psychology department was recently acknowledged for its *impact index*--the highest index (number of citations relative to number of papers published) of any institution in North America and Europe.

For the four years that these students were undergraduates, we used various means of gaining glimpses into their changing perceptions of their disciplinary community and its discourse, their developing concepts of authorship in their discipline, and their growing command of the discourse of psychology. For much of this information, we used interviews and questionnaires. But we also gained some insights by asking them to draw maps of their discipline. We learned about their production of disciplinary discourse--their own authorship--through collecting and analyzing papers they wrote for their psychology classes in the four-year period. To what extent would they define their identities as future psychologists? To what extent would they define their niches for authorship in the disciplinary

discourse? How related would one be to the other? And how related would both be their continuing to prepare for a professional career? We also followed them for a fifth year, having them respond to a questionnaire, keep any papers that they wrote that were related to the discipline of psychology, and participate in a telephone interview. (See Appendix A for samples of questions on questionnaire and interview.)

The Learners and Their Course of Study

These six students--Hiro, Barbara, Michael, Catherine, Lisa, and Arjun--were all born in 1969 and were 17 or 18 when they entered college in the fall of 1987. By the usual standards, these young adults would be considered highly literate. All were ranked very high in their class in high school; one was first but all were in the top fifth. All had high scores on the SAT (averaging 1247 and ranging from 1080 to 1460 for the total score). Yet they had much to learn about how psychologists communicate, and this learning was a gradual process, which continued throughout those four years and continues now as they are in graduate school or beginning their careers. The students in this group had notified the Psychology Department in spring 1988 that they were considering psychology as their major, when the department asked for this information. At the beginning of our study that spring there were two additional students in the group. One transferred to another university her sophomore year, and the other changed his major to creative writing his junior year.

The undergraduate degree in psychology at Carnegie Mellon is designed to give students a broad background in psychology and to provide them with the necessary skills to understand and conduct research. In addition to coursework, students are provided opportunities to take internships at local clinics, hospitals, and schools and to assist professors on projects. According to the director of undergraduate studies in the department, one of the goals of the research-oriented program is to get students "inculcated into the research activities of the department."

Required psychology courses include three survey courses, two research methods courses, and two advanced courses. Students must take two of their three survey courses from the areas of cognitive, developmental, personality, or social psychology. When choosing their research methods courses, students must select two methods courses from the following areas: cognitive, developmental, or social psychology. Through these core courses students are provided a background in the various subfields of the discipline. Students majoring in psychology are encouraged to take elective courses in the discipline to develop a unique academic concentration suitable to their own career interests. Although the department does not have a strongly developed area in clinical psychology, adjunct faculty teach a survey course that covers different approaches to psychological assessment and psychotherapy. Students wishing to pursue clinical psychology are able to work with adjunct faculty and can also set up practica in a local psychiatric hospital. There is also an interdisciplinary program in cognitive science, which includes courses not only in psychology but also in such areas as computer science, psychology, philosophy, linguistics, and decision sciences. Examples of tracks in cognitive science are human computer interaction or natural language processing.

Although the Department of Psychology at Carnegie Mellon is best known for its program in cognitive psychology, only about one-fourth of the undergraduate students pursue studies in that area. The remainder concentrate on

other subfields, such as developmental, social, or clinical psychology. Half of the undergraduates go on to graduate school.

Constructing Disciplinary Identities as (Possible) Future Psychologists

By the spring semester of their freshman year, the students in our study had decided that they would probably be psychology majors. But that decision of a major in psychology provided only the most general perimeter around what might be their community and their professional identity. They attempted to give further definition to both--figuring out what the subareas were and which one of those they wanted to enter, what the possible roles were and which they wanted to fill, what the functions of psychology were and which they wanted to perform *if they were to become psychologists*. These were not decisions that they had to make for their department, but they were decisions that all of them felt they had to make for themselves. During the college years, it can be very important to students to construct their vocational/professional identities. In a recent study into people's construction of "possible selves" across the lifespan, Cross and Markus (1991) found that, when asked to describe their hoped-for possible selves, "occupation selves" were second only to "family selves" among the 18- to 24-year-old participants.

Decision about an area within the discipline would, of course, figure into the six students' identity at the university. It would delimit, to some extent, their immediate disciplinary community at the university because it would determine some of the courses they would take and instructors they would have. Even though it had that immediate significance, the decision about an area was mainly a decision about their futures--what kind of psychologist they would become, what would be the nature of their professional life, what kinds of texts they would read and would produce. For the students this focusing and refocusing continued over the course of their undergraduate careers.

In examining students' maps and their responses to our questions about their discipline, we focused on how these individuals created categories--the themes that they used to construct boundaries for the community of psychology, both around it and within it. Social identity theory maintains that social identity construction involves attenuating differences within a category, accentuating differences between categories, and placing oneself within one of the categories thus formed (Abrams & Hogg, 1990; cf. Tajfel & Wilkes, 1963). To represent the large disciplinary community of psychology, our students could attenuate or accentuate--attenuate differences within the discipline or accentuate differences between psychology and other disciplines. To represent the smaller communities of subdisciplines within psychology, including the one to which they would or might belong, they could attenuate or accentuate--attenuate differences within the subdiscipline or accentuate differences between the subdisciplines. Not only were they attempting to represent psychology as a single discipline and to discover what gave it unity (they were *psychology majors* and might become *psychologists*) but at the same time they were also trying to distinguish among the various subareas (they were to become or might become particular *types* of psychologists). This was a matter of identity construction. They would have some characteristics of all psychologists, but they would also have some characteristics that would put them in particular subgroups and make those not in the group "the others." Our interest was in how they mapped out the terrain and where they placed themselves as they learned more about the discipline.

Bases for Categorizing

As the following paragraphs will suggest, *research* --the process of conducting research and the product of that process, the research article--was a major way that the students attenuated and accentuated differences. It was a way of finding unity within the discipline--attenuating differences within the discipline, accentuating differences with other disciplines. As we will see, research played a major role over the years in three students' attempts to unify the discipline: two who attenuated differences within the discipline and one who accentuated differences with other disciplines. For the other three students, it was mainly a way of creating categories within the discipline--accentuating intradisciplinary differences--by setting research in opposition to other category: research in relation to theory, research versus practice, the role of the researcher versus another role.

It is not surprising, given the context (the explicit goals of their undergraduate program), that the students should be taught or that they should learn the importance of research and its written forms. Nor is it surprising, given the context of the discipline today in which the research report is a privileged form that has become stylized and institutionalized, a form that has become a *genre* in the strict sense of the word--having conventional elements that appear in a conventional order. (See Bazerman,1987, for a history of the form.) Altman (1987) argues that this common form--the research report--has played a major role as a centripetal (unifying) force in this discipline which through the years has experienced strong centrifugal forces to break into separate subdisciplines.

There were other themes that students used in this process of representing the discipline. One predominant method of creating categories in almost all representations was the subdisciplines of psychology: labeling these areas and thus attenuating differences within an area and accentuating differences with other areas. One of the students saw psychology and psychiatry as parts of a larger discipline. Another theme that several of the students used for attenuating differences within the discipline was by emphasizing its focus on people (or on the individual).

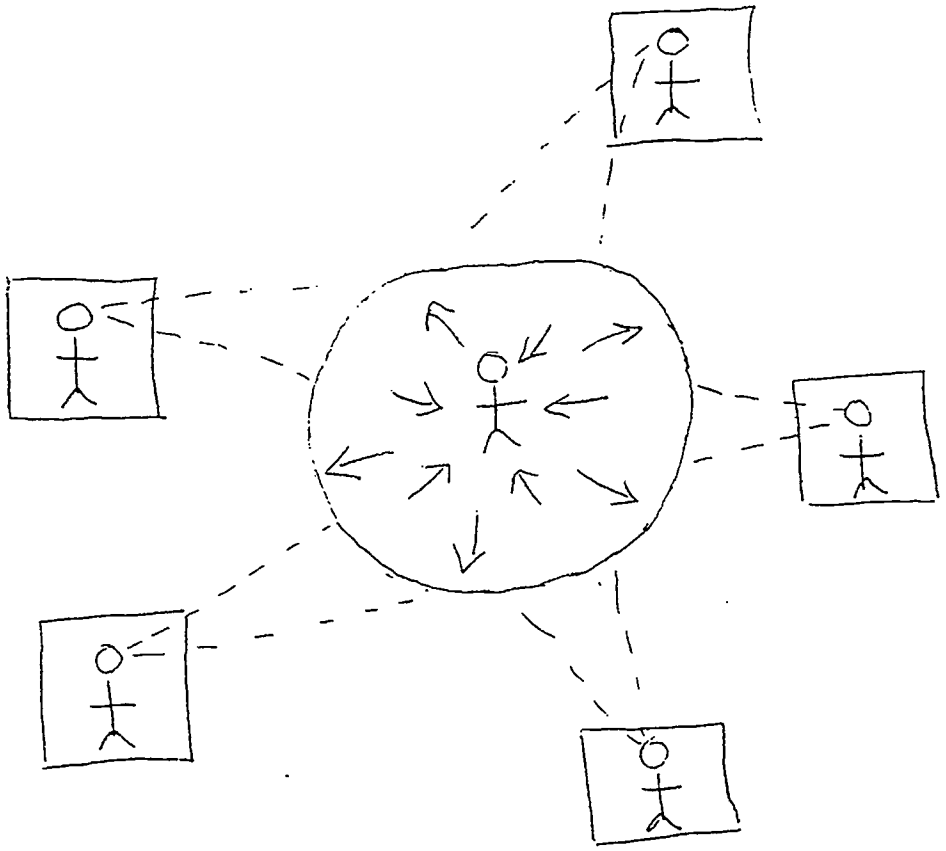
Barbara: Researcher and Practitioner in Clinical Psychology?

More than any of the other students, except perhaps Arjun, Barbara struggled to find coherence *within* her discipline. Her freshman year she talked about a common research method--which she pointed out that psychology shared with science--"collecting data in experimental environment, making generalizations based on the data, and arriving at a conclusion about some aspect of human behavior." She thought that beyond the general commonality, there would be differences across areas, such as cognitive, abnormal, developmental, and clinical. The latter was her interest. She had decided on psychology as her major but had not decided on it as her career. She saw an undergraduate degree in psychology as a starting point for either of two kinds of futures: pursuing studies and a career in law or medicine or pursuing further studies and a career in psychology (probably in clinical psychology). During her sophomore year she decided on psychology.

By the end of her sophomore year, she was thinking that coherence in the discipline might be through a set of basic theories that psychologists in different subdisciplines (differentiatiated by their focus of attention) draw upon, such as behavior theory, psychoanalytic theory, cognitive theory, and humanistic approach. Her idea was that "good" psychologists can borrow perspectives from a variety of theories and that was something that she wanted to do in her work. Her junior year, when she took courses, she thought coherence might be not only through theoretical connections but also through a common set of issues that all subdisciplines deal with. By her senior year, she had given up on this attempt to find complex epistemological connections, and she then settled on coherence as coming (more simply) through a common focus on the study of the individual--not theories and not issues because those differed among subdisciplines. She had also decided that, even though research was how knowledge was built in all subdisciplines, specific methods differed so across subdisciplines that method was not a way to see unity.

That last year, when she produced the map shown below in Figure 1, she explained that cohesiveness lies in the "aim of psychology to make conclusions about aspects of thought and/or behavior." At this point she accentuated theoretical and methodological differences across subdisciplines, saying that different schools of thought are "both *inspired* and *restrained* by the beliefs which characterize their specific school of thought." She added that different kinds of psychologists, for example cognitive psychologists and social psychologists, "ask different questions (e.g., What strategies are most effective in increasing memory? versus What environment is most conducive to learning?) and conduct their research in different ways (testing a computer simulation of thought processes versus conducting an observational study)."

In talking about the larger discipline of psychology, she gave little attention to any dichotomy between research and practice. However, this dichotomy, which she saw within her own subdiscipline, did come up frequently when she talked about her identity as a clinical psychologist. From her sophomore year on, she made it clear that she wanted a career as both a practitioner and a researcher--not only to have a clinical practice but also to do research and publish results of her studies. The choice to become a therapist was not a dismissal of a career as a researcher. However, she saw herself at the end of her undergraduate studies as more qualified as a researcher because that was what was emphasized in her program. She would be entering a graduate program in clinical psychology at a public university in the Midwest, where she hoped to prepare herself for both roles.



In the center is an individual. This person is affected by his/her environment (arrows pointing toward the figure) and responds to these stimuli (arrows pointing away from the figure). The figures in the boxes which surround this person represent psychologists from different schools of thought who see the individual from

Figure 1. Barbara's fourth-year map

Arjun: Cognitive Scientist?

Like Barbara, Arjun focused mainly on the discipline as a whole when he talked about it. But unlike Barbara, he was mainly interested in differences between psychology and other disciplines. He liked to try to place psychology in relation to other disciplines, particularly philosophy and the sciences. From the first year he saw a close connection between philosophy and psychology. The first year he showed, in his map, how psychology had its roots in philosophy and how philosophy ran throughout psychology as well as through other disciplines. The next year he focused more on accentuating differences between the two. Even though psychology had its roots in philosophy, there was an important distinction he wanted to make between the two. That lay in scientific method--research. In philosophy there is only theory; in psychology there is experimental justification of theories. That same year he was aligning psychology with scientific disciplines, pointing out that they share the same general methodology, though there is more calculus and less statistics in "hard sciences" than there is in psychology. He also compared psychology with other social sciences: "One thing psychology has over other social sciences is its models are better. In economics and political science, all you see are statistical models--regression models." The questions he was struggling with were to what extent psychology *is* scientific and to what extent it *should be*. A year later (his senior year), his conception of the discipline was much the same, though he was focusing more on "where psychology fits into the rest of the world."

Figure 2 shows his fourth-year map, produced after he was out of school one year, in which he attempted to show how disciplines relate to one another. Analytic thought was one bit category. It encompassed most academic disciplines, including philosophy and literary criticism, and psychology--part of it--fit there too--some theoretical aspects and clinical psychology. The other big category was science. Most of academic psychology--cognitive, developmental, and any other branches using the scientific, experimental method and collecting data--fit there.

Unlike the other students, Arjun did not give much attention throughout the years to accentuating or attenuating differences among the parts of psychology. It was clear which category he favored and where he placed himself--if he were to go into psychology. To him, cognition was the "best part of psychology"--best not only in terms of what was interesting to him but also in terms of its importance: "Cognition--that's where you have to start. It's the critical thing." In his map his first year he had a pyramid with cognitive psychology at the top and other subareas beneath them. The next year he had cognitive, developmental, and social as the three main areas of psychology, and he pointed out that those are the three major areas of CMU psychology. He guessed he was "becoming a convert" to seeing things the way CMU sees it. His third year he tried (unsuccessfully) to eliminate the "ordering of goodness" for the three.

Arjun was committed throughout to his major in cognitive science, but he was not sure how it would fit with the work he would be doing after college because he did not know what that work would be. As a freshman he had thought he would like to make contributions to psychology (help "unify the field") and was thinking about a career in academia. But over the next two years he struggled with the nature of that kind of a career, including the writing that would be required:

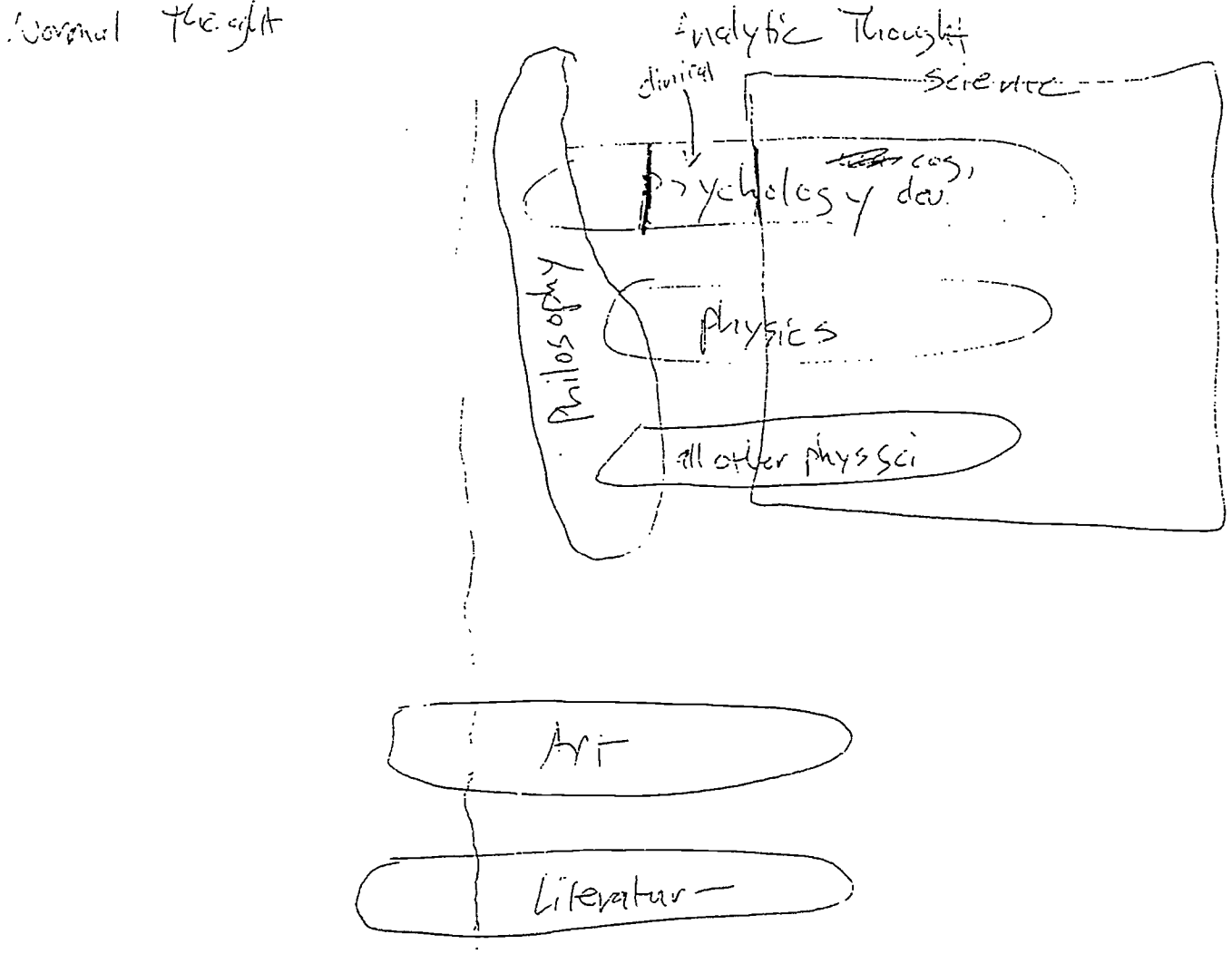


Figure 2. Arjun's fourth-year map.

> I'm finding out more about hassles that you have to go through as a psychologist. Like you have to publish like mad....There are a lot of other things I want to do in life and, once you get into academia, it's hard to get out--especially if you're a psychologist.

He was also thinking about the nature of knowledge in the discipline he would become a part of. He thought the strength of psychology was science, and he wanted it to be even more scientific than it was. His third year, he was giving much attention to what he called "the big questions": What are the tools of psychology? and How powerful are they?. And upon graduation at the end of three years, he was thinking very little about the possibility of an academic career and went to work (he saw it as temporary) as a programmer for a major research project in education in the city where he had grown up. At the end of the fourth year of our study, the year after his graduation, he was still trying to answer those big questions. He was particularly concerned that the experimental method was not able to distinguish between theories: more than one theory could explain the same experimental results. At that point he was reconsidering his career options and was thinking about graduate school. It might be in psychology (which would mean academia) or might be in public policy (which would not).

Lisa: Researcher?

Lisa's attention in representing the discipline, for much of her undergraduate program, was on its unity, which she saw as its emphasis on research. Much of her attention went to the research *process*--the sequence of operations that psychologists use in making their contributions to knowledge . Her freshman year she explained how a psychologist thinks in three stages: (1) observing and recording relevant data, (2) interpreting and classifying the data, and (3) theorizing about causes and consequences and searching for patterns. As might be expected, when asked to draw a map of how she saw the discipline organized, she drew a flow chart of the research process. From the first year, Lisa was definite about her major in psychology and her interest in research. As she explained her freshman year, she was at this particular university to learn about research "since it is so well known as a research center." Early interests were cognitive processes, information processing, and individual differences.

As a sophomore, she was still seeing unity within the discipline through its method and was thinking about herself as a potential researcher. But she was beginning to point out differences within psychology, particularly theoretical differences among psychologists. The theoretical differences would not keep researchers from using the same general method but would affect what researchers "see" when they do their observations. She made distinctions among different types of psychological theories, such as phenomenological, Freudian, and cognitive (types she had studied in a General Psychology class) but saw them as unified through common use of scientific method. She herself was not aligned with any particular theoretical group. She continued to accentuate differences through her junior year, but was thinking then more in terms of areas rather than types of theories, subdisciplines each with its own "assumptions, issues, and concerns" making "each like a separate discipline or field." Still she saw research as the unifying force: "All are interested in actual experimental support, carrying out research to prove/disprove personal theories....All are driven to find an answer and assume that there is one." That year her map was a flow chart, in some ways like

the one her freshman year but more recursive and with more emphasis on social aspects of research, such as peer review.

She felt a need to specialize, she explained, because of CMU's emphasis on research in particular areas. But she never really decided on a subarea within psychology, even though much of her work was in developmental, including some independent research supported by CMU undergraduate grant. This is the way she put it at the end of her junior year:

> Since I have a little experience/knowledge in several of the disciplines, I at least know enough to say that I really don't know much at all. My experiences have given me some knowledge and thus some beliefs about psychology, especially developmental, since that is where I have the most knowledge. I don't look for any specific explanation to my observations but rather include several rationalizations based on cognitive, social, or personality theories.

Her senior year, though she herself still did not have a specialization, she was giving much attention to relationships among the areas--now not only how they differed but also how they overlapped (something that she became very interested in when she took a course in experimental psychology, which reconfirmed her interest in research). Her map that year, illustrated in Figure 3, showed divisions (distinguished by different theories, beliefs, ideas), such as cognitive, developmental, abnormal, but also hybrid divisions that fit between those divisions, such as cognitive-developmental and cognitive-abnormal.

Over the years at the same time that she was learning about psychology, she was also taking a number of courses for her second major, which was in policy and management. Her career plans, she explained, had been sort of a pendulum: thinking she wanted to be a psychologist, then getting more into management, then going back to psychology, but then out again later. At the time of graduation, she was at the psychology end of the pendulum, she said. She was planning to go to graduate school in psychology after a few years of working to save some money, and she wanted eventually to become a professor. Lisa presents a sharp contrast to Arjun: She did not know what her niche would be in psychology, but she was fairly sure (at least at graduation time) that a career in psychology was what she wanted; Arjun had a very complete idea of what he would be doing if he were to remain in psychology, but he was quite unsure about staying in it.

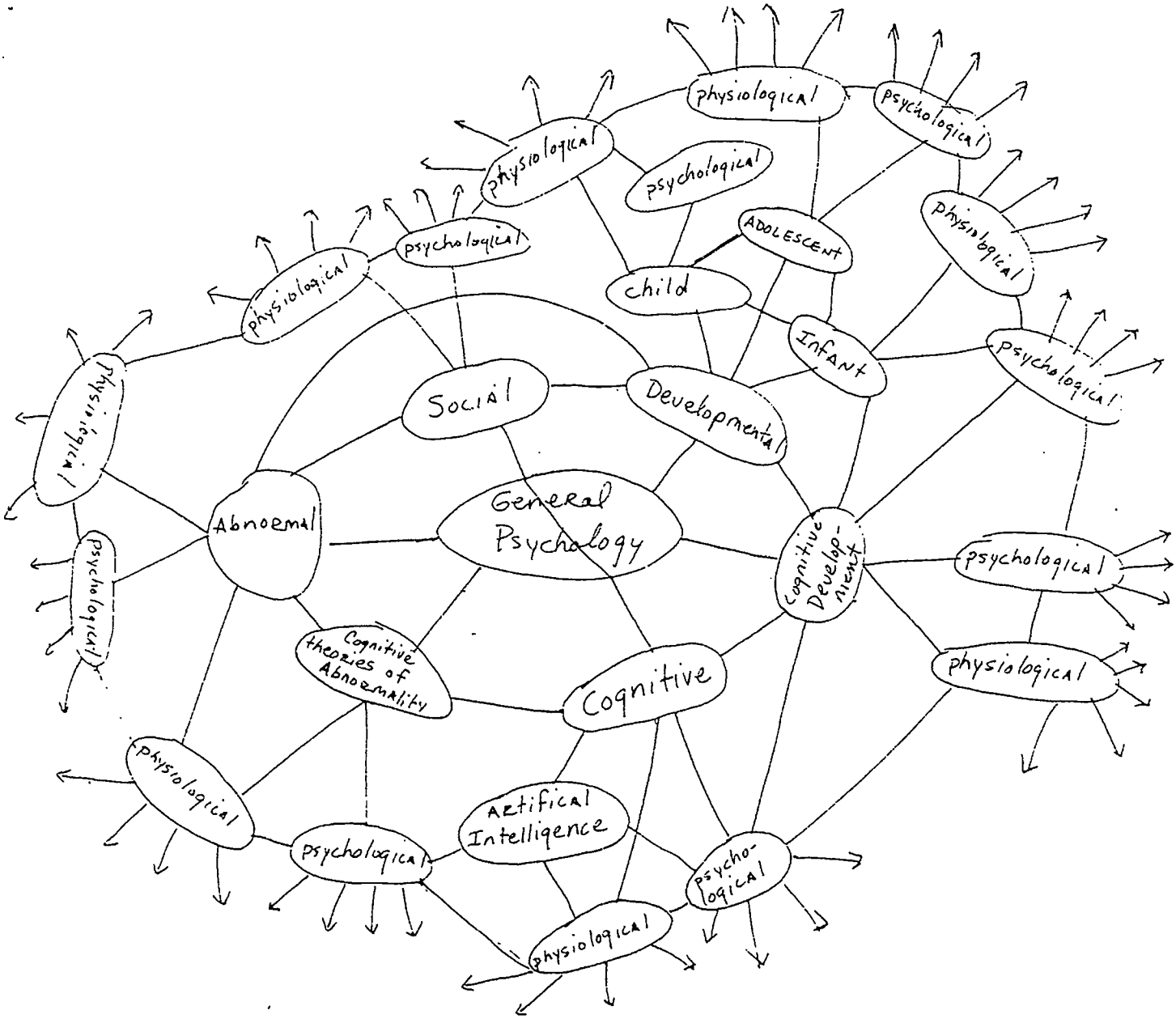


Figure 3. Lisa's fourth-year map

Michael: Clinical Therapist?

From the first year on, Michael found unity in the discipline through its focus on people. It was a people-oriented discipline. At the end of his freshman year, he thought his major would probably be psychology because he was very interested in people--"what makes them tick"--but he was also giving some thought to history as a major. His key principle for differentiating parts of the discipline of psychology was functional--what psychologists do. His freshman year he created categories based on function: research, teaching, and application.. As a freshman he was not sure what area of psychology he would pursue if he were to major in psychology, but he was interested in research (cognition and artificial intelligence). His sophomore year he continued to see the three functions of present-day psychology: research, teaching, and application (e.g., therapy). But to him all were related because psychology is a discipline "geared toward people, either helping them or understanding them." By the end of his sophomore year, he decided on psychology over history, but instead of cognitive research it was the application end of psychology--helping people--that he would go into. He had taken a course in abnormal psychology and liked that. Also his father was a clinical psychologist.

His junior year, when he really got into his psychology courses, he drew the lines differently for functions within the discipline; now research and teaching were combined--both as components of academics (explaining "very few people just teach it"). He saw an academic career as distinct from a professional career, which would emphasize application--helping people. He made this change, he explained, because he was considering graduate schools and was finding some more research (academically) oriented--which included research, theorizing (writing academic papers)--and some more application (professionally) oriented--which meant helping people. He pointed out the tension:

> There's research being done, and there's teaching of it, and that's the academic part of it. And the other side is the people who are applying it. And there are lots and lots of ways to apply things, like designing things better, helping people with their memories, or reducing stress in the workplace. And there's helping people after they have a problem. If you're a researcher, you don't do a lot of application. I think you do a lot more theorizing and write a lot of papers.

His own plans became more articulated: he would go to graduate school and become a clinical psychologist--would "help people as individuals rather than research them in numbers." He could not see himself as a researcher. He was interested in becoming what he called a "professional psychologist," as opposed to an "academic psychologist." He was not going to try to do both, as Barbara was.

Figure 4 is his sketch his senior year. He again had two categories but they were different ones: the production of knowledge (research, which could be done in the areas of social, cognitive, clinical, developmental, learning, industrial, organizational, neurophysiological, etc.) and use of knowledge (teaching and application--which would comprise therapy, counseling, assessment, etc.). The two were, of course, interconnected because the research findings would be applied to help people. It was clear where his place would be--therapy (within application within use). He would be entering a graduate program in clinical psychology in the fall, where he would learn more about both production and use of knowledge but would emphasize use (application of knowledge through therapy).

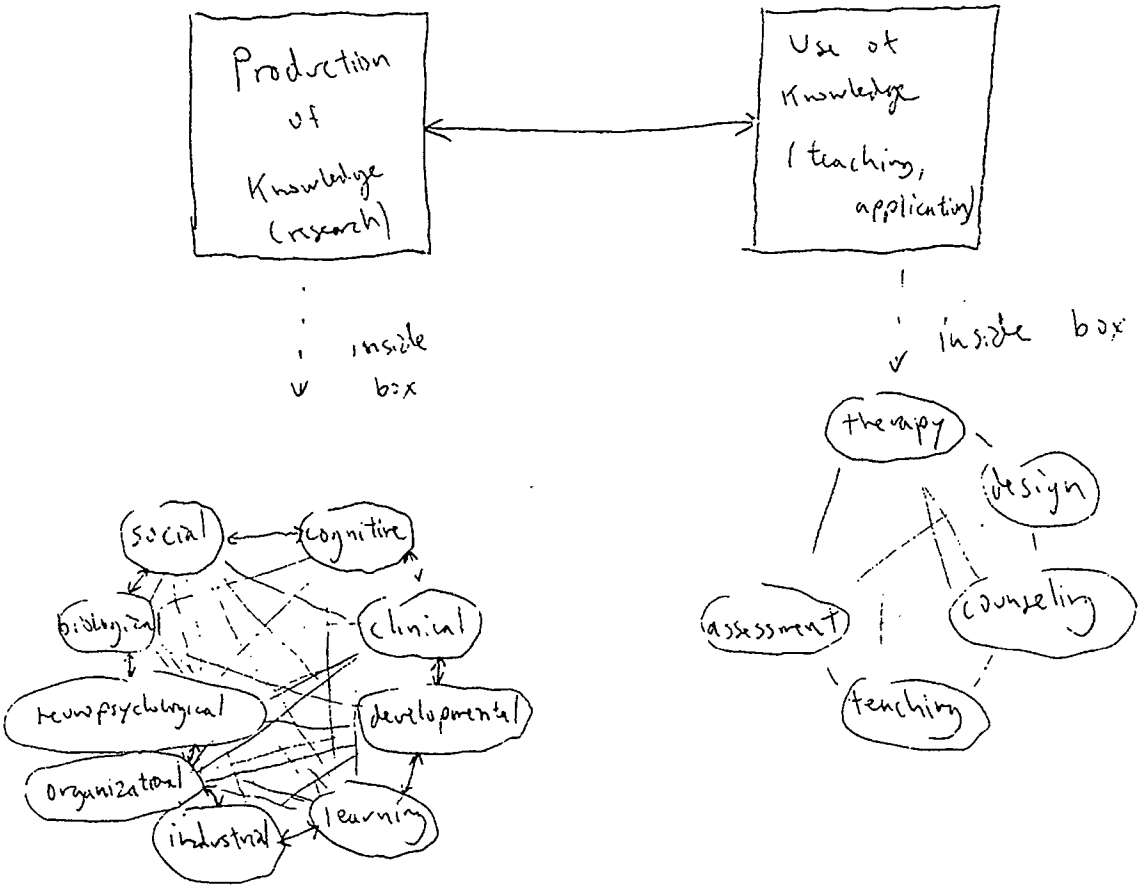


Figure 4. Michael's fourth-year map

Michael saw his clinical courses and internships as important because they confirmed his interest in helping people, his cognitive psychology courses and research courses as important because they confirmed that he did not want to be a cognitive scientist or a researcher. Interestingly, he also saw his fiction-writing courses as relevant because fiction-writing also deals with people. As he put it his senior year, "Building a person's personality in their character...[you] need to build something believable. You've got to know something about people in order to do that, and that's what psychology is about, the study of people."

Hiro: Counselor?

Over the years, Hiro was able to find unity in the discipline mainly by emphasizing a common function--*helping* people. Even as a freshman, he spoke of psychology in these terms which helped to tie together other functions: understanding and predicting people's behavior (research) and assisting with their psychological problems (application). And that is how he saw himself as a future psychologist: someone who helps people--another like Michael who would be going into application. He had decided on psychology as his college major when he was still at his high school, where he had a role model, a school counselor. He was attracted to psychology because he liked working with people and helping them find solutions to problems. Throughout his undergraduate career he continued to emphasize the general usefulness of psychology--its potential for helping those with problems, improving educational systems and social establishments, expanding human capabilities, explaining abnormalities, and understanding human behavior.

Like Michael, Hiro tended mainly when representing the community of psychology to accentuate differences *within* the discipline. But, unlike Michael he focused on the areas of psychology rather than the functions of psychology as he metaphorically (through his words) and figuratively (through his maps) drew his boundaries. His freshman year, he talked about the discipline as being composed of distinct subareas, such as behavioral, cognitive, clinical, social, and abnormal. A year later, he portrayed psychology as organized into four major branches: developmental, social, cognitive (the three areas emphasized at CMU), and clinical (an area in which CMU offers courses). He drew a graph with four circles for the branches and he accentuated differences through topics of interest, issues, roles, and settings. That year he indicated an interest in counseling, which he thought would fit into clinical psychology (where he also put abnormal psychology).

His junior year, when he really got into his psychology courses, he made a major change for his identity as well as his representation of the community. In his map that year, he moved counseling out of clinical, where it had been the previous year, and made it a distinct subdiscipline itself. He still saw the two areas as similar because psychologists in both helped people with problems. But the two were distinct from each other because they dealt with different kinds of problems: "counseling deals with emotional factors rather than major psychological factors or mental disorders" (the factors of clinical psychology). He was delineating his community, and he was also defining his identity--specifying what his own work would entail. He did this mental recategorizing, he explained, when he was researching graduate schools. His senior year he mainly elaborated rather than restructuring when he spoke with us and drew his map, which appears below as Figure 5. That year, while working as a teaching assistant for a course in general psychology, he learned about two other areas: existential psychology for him was another subdiscipline, and physiological psychology for him was a subarea within

cognitive psychology. After graduation he would be entering a graduate program in counseling at a state university in the Northwest.

Catherine: Developmental Psychologist?

Like Michael and Hiro, Catherine tended to focus through the years on differentiating the parts of the discipline, which to her included both psychology and psychiatry. Her approach was somewhat different because, even though she focused on functions, her actual categories were roles that people fill as they perform the functions of psychology. Her freshman year she emphasized a hierarchy of functional (research) roles in an academic setting: the psychologist (doing research and publishing), the graduate student (doing research and taking courses), and the undergraduate student (taking courses and being a guinea pig for psychologists and graduate students). The latter, of course, was her current role; the others were possible roles for the future. Other distinctions she was making were among the areas of psychology and between psychology and psychiatry. She had come in with interests in clinical psychology and pre-med (to become a psychiatrist) and then decided during her first year that her focus would be on development--particularly child development.

During her second year she began to work on the differences between psychologists and psychiatrists, both of whom fit within her large domain of psychology, according to her perspective, and both of whom were possible future identities for her. To her, the distinction was that a psychologist would mostly do research, whereas a psychiatrist would deal with patients--contrasting research and practice. She was still thinking about going to medical school to become a psychiatrist (and work with children). The third year she continued to distinguish between psychologists (who would teach and do research in such subareas as developmental and social) and psychiatrists (who would do clinical work). She noted that they would have different credentials for doing their different kinds of work: A psychiatrist would have an MD and thus would be able to prescribe medication and a psychologist would have a doctorate but would not be able to make prescriptions. During that third year, while completing most of her coursework (mainly in developmental and clinical psychology), she began thinking that, instead of pursuing graduate studies to become an academic psychologist or a psychiatrist, she might go to graduate school in early childhood education. She had talked about that possibility with the director of the CMU children's school, where she had taken an internship and had done an independent study. Being a director of a children's school herself would be a way to combine her knowledge in psychology and management (her second major). The fourth year, after she had graduated with honors at the end of the first semester, she put both psychologists and psychiatrists within the areas--developmental, social, cognitive, etc--as shown in Figure. Both could teach and do research.

By the time she completed her coursework, which took her only three and a half years, she had not decided what she would do with her degree in psychology, and she was considering her options. The following spring she was still unsure what kind of program she would go into if she were to pursue graduate studies or what kind of career she would have. She had applied for a research fellowship and was considering applying eventually to graduate school.

Figure 5. Hiro's fourth-year map

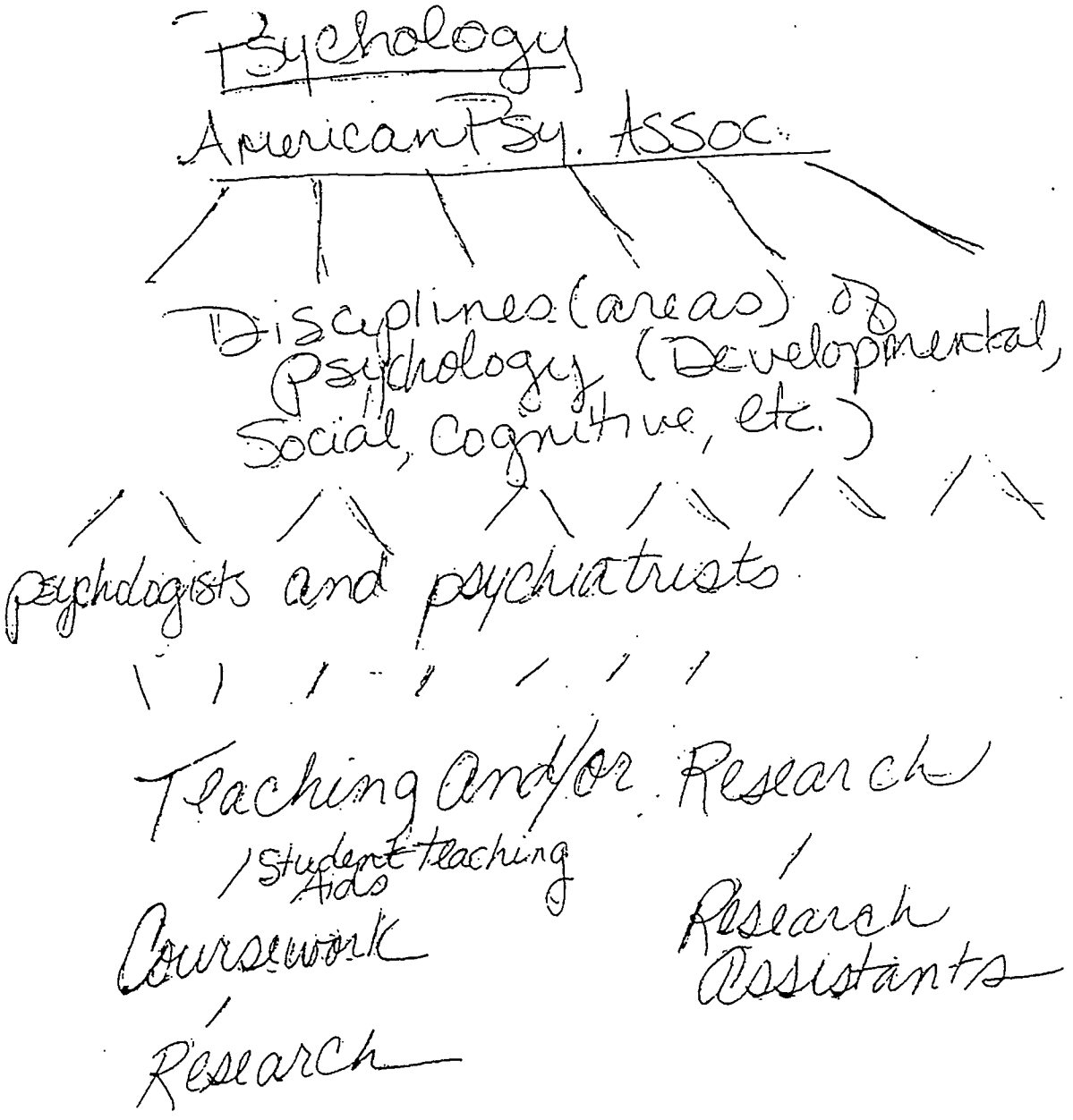


Figure 6. Catherine's fourth-year map

Summary

Most of these students seemed to begin conceptualizing their places within psychology fairly early in the undergraduate programs--creating categories within psychology and placing themselves within those categories. That was the case for Barbara and Michael. And it was also true for Arjun, who knew what his category and place would be if he were to stay in psychology. Hiro too had a good idea of which area he belonged in, but he did not determine till his junior year where his category fit in the discipline. The other two students had more difficulty with their identities in psychology. Catherine struggled to define hers throughout her three and a half years as an undergraduate--whether to become a psychologist or a psychiatrist--but she knew that she wanted to do work with children. Lisa was still exploring the discipline at the end of her undergraduate years. She was able to identify with psychology, but she did not place herself within any smaller category.

Constructing Authoring Identities

Through their undergraduate years, the students wrote a variety of texts for their psychology classes, including syntheses (literature reviews) of research, reports of research, proposals for research, summaries, and summaries with critiques; in addition, one student wrote a proposal for a program. Students wrote on the average 15 psychology papers. As Table 1 shows, the most frequently produced form for most students was the research report; they each wrote several reports of small-scaled studies, some for research methods classes but often for other classes as well. Three of Arjun's research projects were somewhat different from the other research reports he wrote and the ones produced by other students because his method of testing in those three studies was modeling on the computer. The number of research reports averaged seven. Included in sets of papers for four students were honors theses. Hiro, Barbara, and Michael wrote honors theses over the two semesters of their senior year, and Catherine wrote one during the single semester of her fourth year. For Barbara, Michael, and Catherine the theses were research reports, but for Hiro the thesis was a program proposal.

Table 1

Numbers and Types of Papers Written For Psychology Courses Each Year

	P Courses	Papers						
		Res	Lit R	R Prop	Sum	S/Crit	P Prop	Total
Barbara								
1987-88	1	--	1	--	--	--	--	1
1988-89	2	--	1	--	--	--	--	1
1989-90	9	6	2	1	--	3	--	12
1990-91	2	1	--	--	--	--	--	1
Lisa								
1987-88	3	--	1	--	--	--	--	1
1988-89	1	--	--	--	--	--	--	--
1989-90	4	8	--	--	--	1	--	9
1990-91	2	--	2	--	--	--	--	2
Arjun								
1987-88	2	1	--	--	--	7	--	8
1988-89	--	--	--	--	--	--	--	--
1989-90	4	5	--	--	--	--	--	5
(graduated in May 1990)								
Michael								
1987-88	1	--	1	--	--	--		1
1988-89	3	1	1	--	--	--	--	.2
1989-90	5	5	--	--	3	--	--	8
1990-91	5	2	--	1	--	--	--	3
Hiro								
1987-88	1	--	1	--	--	--	--	1
1988-89	--	--	--	--	--	--	--	--
1989-90	6	6	--	--	--	3	--	9
1990-91	5	1	--	1	--	--	1	3
Catherine								
1987-88	1	--	1	--	--	--	--	1
1988-89	--	--	--	--	--	--	--	--
1989-90	5	5	1	1	10	2	--	19
1990-91	4	3		1	--	--	--	4
(graduated in January 1991)								

Becoming Conventional

Did their writing become more conventional?. One way to think about convention in discourse is in terms of stylistic features--features that conform to accepted standards, such as those set out in the APA (1983) manual. Not surprisingly, we saw increases for all students in the rather easily quantified markers of appropriateness for psychological writing--use of headings, citations,

etc. according to APA format. This change was not at all surprising because they were given much formal and informal instruction in writing according to APA style, in research methods classes and other classes as well.

A second way to think about convention is in terms of decreases in stylistic features that would be unusual for writing in the discipline. We noted these changes too. Perhaps the most notable mismatch with the discourse of psychology was a rhetorical strategy that Barbara used in her papers the first two and a half years. It was beginning the paper with a quotation. Here are examples of some of her beginnings for psychology papers:

Fall 1987 Sex Roles and Personality Paper

> "In his book, *The Changing Roles of Men and Women*, Edmund Dahlstrom summarizes the traditional ideological position on sex roles as follows: 'God created man and woman as essentially different types of beings. Woman is weaker. Man is lord and master.' Our acknowledgment of sex roles in today's society--although not quite as narrowminded--has roots in theological teachings such as this. . . . ."

Spring 1989 Depression in Women Paper

> "'How weary, stale, flat and unprofitable seem to me all the uses of the world," declared the melancholy Hamlet. We hve all experienced occasional bouts of depression and have perhaps shared Hamlet's bleak outlook. . . ."

Fall 1989 Report of Study of Sensitivity

> "'He is. . . constantly alert to the heart rending, burning, or happy events in the world, molding himself in their likeness.' Such is Pablo Picasso's definition of an artist. However, awareness and subsequent internalization of emotions are not unique to the artist; in general, these characteristics form the core of the sensitive individual. . . . "

Fall 1989 Paper about Children's Play

> "'Children are overwhelming, supercilious, passionate, envious, inquisitive, egotistical, idle, fickle, timid, intemperate, liars and dissemblers; they laugh and weep easily, are excessive in their joys and sorrows and that about the most trifling subjects; they bear no pain; already they are men.' After 200 years, Jean de la Bruyere's characterization of children's behavior is still startlingly appropriate. . . ."

When we asked her in her interview her senior year about this stylistic change, she explained that she had learned to start papers this way in high school and was in the habit of doing it when she came to college. Even though it had been an effective way to focus herself, she came to realize that it was not appropriate for writing in psychology.

A third way of studying conventionalization was the approach we took: conceiving of conventionalization in the more literal sense of "having to do with a convention or assembly" (or community)--similarity to the way in which members of the disciplinary community produce an interrelated body of work. In studying a

student's body of work intertextually, we looked for thematic development of two types across texts: topics and methods. To what extent did students pursue a topic intertextually? To what extent did they find methods that seemed to work with their topics and continue with a particular methodology? Both were ways of creating categories--communities with research traditions beyond themselves and beyond the psychology department at the university. We also looked at the more explicit construction of an intertextual community through citations. This too was a way of not only constructing a community but also beginning to establish an authoring identity--defining an interest group and placing oneself in it.

We were asking a descriptive kind of question--Whether or not undergraduate students *do* this? We were not asking whether or not students *should do* this. There are, of course, benefits to the student in building an interconnected body of work, but there are also, no doubt, benefits to starting new projects in each class. We were also not pursuing answers to a question about *why* --why students do or do not do this.

Creating an Interrelated Body of Work: Two Who Didn't

Michael 's corpus. As Michael pointed out himself, he did not have a particular research interest that he pursued throughout his undergraduate career. The larger portion of his corpus--papers dealing with such issues as hypnosis and memory, electroconvulsive therapy, mood and reactance, and consumer self-help movement (his honors thesis)--are tied together in only a general kind of way in that all are on topics one would probably want to be knowledgeable about in an eventual career as a clinical psychologist. But in his papers there is little redundancy of thematic material and little evidence of an intertextual community established through citing repetition of sources, and the papers do not build in any cumulative kind of way. Although hypnosis was a topic that he was already interested in and wanted to understand better, he chose most of his other topics when something that seemed interesting came up in a class. When he was reading psychology journals to meet a course assignment, he ran across an article on electroconvulsive therapy, became interested in it, and decided to write his major paper for the course on it. (He would also save some time, since he had already done some reading on the topic.) He wrote the mood and reactance paper because he became interested in some of the research that the professor teaching his Social Psychology course had conducted--and drew from it.

He chose consumer self-help as a topic for his honors thesis when guest speakers came to one of his classes and spoke about the movement. As he explained, he did things backwards for the thesis ("something they don't recommend doing")--deciding that he wanted to do one and then deciding what it would be. This paper was on a topic that had not been introduced in previous papers, and it involved use of a data collection methodology he had not used before: participant observation. He had observed individuals' behavior for some of his previous studies, but he had not before attempted to become a participant in the social group he was studying.

The two most clearly related papers were those he wrote for his developmental psychology classes reporting his own studies examining sex differences in children. In the fall semester of his junior year he reported a study of "Sex Differences in Play Initiation" for his class in Child Development and then in the spring of that year he reported a study he conducted of "Sex Differences in Memory" for his class in Research Methods in Developmental Psychology.

Though he cited different articles, he did cite the same pair of co-authors for both papers: Jacklin and Maccoby (1987) in the former and Maccoby (1966) and Maccoby and Jacklin (1974) in the latter. He explained to us that these topics were not of particular professional and scholarly interest to him.

During this period of development, he was exploring new topics that interested him and might be important to him--not staying with same topic and considering new aspects of it. He became most aware of this characteristic of his writing when he was applying to graduate schools: "I know this happens with graduate schools. They ask you what are your research interests, and I couldn't say I've been working on this since my freshman year."

Lisa's corpus. Lisa's corpus of texts is the least interconnected of any of those produced by students in the study. Across texts there are few thematic links and no citational links. Two of her assigned research reports--one of the two she wrote for Principles of Child Development and one of the four she wrote for Research Methods in Developmental Psychology--were on play behavior. These papers, "Birth Order and Tendency to Affiliate through Play" and "Gender Differences in Play," had no intertextual links except for the fact that both studies dealt with play. Her senior year she wrote two major papers--both literature reviews. One was on the assigned topic of behaviorism for her course in History of Experimental Psychology, and the other was on the chosen topic of blindsight for her course in Perception and Perceptual Development. Blindsight was something that the professor mentioned in class but did not explain. Lisa talked with him about it and decided, after their conversation, that it would be an interesting topic.

When we asked her at the end of her senior year if she had recurrent themes or interests, she said no, that her topics and interests were "all pretty broad."

Creating an Interrelated Body of Work: Four Who Did (To Some Extent)

Catherine's authoring identity. All of Catherine's papers were on aspects of child development. This was true not only for her courses in developmental psychology but also for her courses in Cognitive Processes and Research Methods in Social Psychology. Recurring themes in Catherine's corpus of writing were particular aspects of children's development. An especially predominant theme was play behavior and its relation to other factors. For her very first psychology course, the course in Cognitive Processes her freshman year, her paper had a major section on play behavior as it related to her topic, the development of symbolic thought. In papers written for two subsequent courses she reported results of observations of play behavior. One of them, which was for an independent study in the children's laboratory school, reported an observational study examining connections between birth order and play behavior. The other, produced the following semester, was an assigned report of a more formal study on the same hypothesized relationship (still based on observation) for a course in Research Methods in Developmental Psychology. Her honors thesis, which she wrote in her final semester, was also on play behavior, specifically, the influence of dramatic play on language development. This piece too was based on an observational study.

In this set of papers as well as critques that she wrote of published works, the major intertextual pattern is her classifications of types of play behavior. In her first psychology paper her freshman year she was beginning to distinguish among

different types of play behavior, pointing out various distinctions that have been made. For instance, one scheme she used was from a book by Herron and Sutton (1971): autocosmos, microsphere, and macrosphere. Her first observational study used six categories of play behavior from Parten (1932): unoccupied behavior, solitary play, onlooker behavior, parallel play, associative play, and cooperative play. The second report she wrote was based on a group project also using observational methods; it had a collapsed set of only three categories, all clearly defined and distinguished: nonplay, solitary play, and influenced play. And the third used two categories, higher and lower forms, which Catherine adapted from Smilansky and Shefatya's (1990) set: functional, constructive, "games with rules," and dramatic. For her coding scheme, Catherine considered dramatic play as higher and the other three forms as lower.

Hiro's authoring identity. Hiro, who saw psychology as a discipline that helped people and saw his own future as a counseling psychologist who would help people, built a corpus of scholarly work that tended to focus (when topics were of his own choosing) on issues of gender and trauma. His first study in this area, a survey conducted for a course in Individual Differences his junior year, was on "Gender Differences in Perception and Knowledge on Rape and Its Related Subject Matters." He had become interested in the issue of rape when he took a course the previous year in Abnormal Psychology and rape was discussed. A second study, conducted the same semester for a course in Research Methods in Social Psychology, was on "Gender Differences in the Use of the Verbal Method for Coping with Trauma." In his introduction to the latter paper, rape was included in a list of the kinds of events that can cause trauma. This study, like the other, had survey as the data collection method. His honors paper the final semester, "A Date Rape Prevention Program: Rationale and Design," was thematically related to both of these. It was motivated, to some extent, by what he learned in his gender and rape perception study. The following is an excerpt from the conclusion of his paper on gender differences and rape:

> On the Comments and Ideas section of the surveys, I received many positive responses concerning the study, and many participants pointed out that it made them feel and think more deeply about the subject of rape. One of my goals in the future is to conduct rape awareness programs on the CMU campus, and if these surveys alone stimulated thoughts and interests of many people, the programs may prove to be very effective.

Although the honors thesis was foreshadowed by the previous text and motivated by findings of the previous study, the thesis did not refer to Lee's previous study. But there was recurring thematic material between the first paper and the honors thesis. For example, the myths of rape were referred to generally in the first paper ("There are a lot of myths and surprising truths about rape and fear of rape") but were listed in the honors thesis (e.g., "Nice girls don't get raped and bad girls shouldn't complain"; "Rape is an impulsive, unplanned act").

Another intertextual link was his pointing out in both papers that a potential rapist does not have a distinct psychological profile. In the first paper he put it this way:

> Furthermore, researches indicate that most rapists do not fit into any specific psychopathological type, nor are they more disturbed, sexually abnormal, or physically different from any man on the street (Griffin, 1971). This, in

turn, places more impact on a statement made by Griffin that "all men are potential rapists, and every woman is a potential victim."

In the honors thesis it was worded this way:

> [Rape] should not be thought of as a violent sexual act committed by a few mentally ill men. Studies have indicated that convicted rapists are not significantly different from any other man in terms of their psychological or physical functioning (Kanin, 1983). Studies utilizing the MMPI (Minnesota Multiphasic Personality Inventory) have also shown no evidence for the presence of personality disorder or neurotic/psychotic psychopathology (Koss, Leonard, Beezley, & Oros, 1985). This supports the idea that every man is a potential rapist, and the characteristics of rapists are similar in all rape categories.

One of the claims (rapists not that different from nonrapists) attributed in the earlier paper to Griffin's (1971) article in *Ramparts*, was no longer attributed to Griffin but was now supported by citations of two psychological studies. Hiro was changing to sources that were forums for the disciplinary community. And the related claim (every man as potential rapist) was now in the realm of shared knowledge--a claim that did not need citational support.

Interestingly, there was no *explicit* redundancy of sources; none of the same texts were cited across any of these three papers.

Barbara's authoring identity. Barbara's corpus of papers had some interesting intertextual links. Several topics she chose were gender-related problems and issues. In fact, the first psychology paper she wrote (topic chosen from a list) for her freshman course was on cross-cultural sex roles of women; it was titled "The Effects of Socialization and the Subsequent Adoption of Sex Roles on Personality." The paper she wrote two semesters later for a course in Abnormal Psychology was on "Depression in Women," and one she wrote for Personality and Health was on "Premenstrual Syndrome and the Cycle of Misunderstanding." In all three papers she gave much emphasis to cultural influences on the construct, and in the sex role paper and PMS paper she argued that each was socially constructed. Although all three papers were essays based on literature review, within two of them--sex roles and PMS--she embedded results of small-scaled studies she conducted herself related to the issue she was examining.

Two of the other papers, one of which was her honors thesis, were on therapy with children. For a class in Clinical Psychology she wrote on "Sexual Abuse and the Healing Powers of Play Therapy," and she wrote her honors thesis on "Guardians and Children as Sources and Targets of Behavioral Assessments: A Study of Correlation, Correspondence, and Treatment Effects." The thesis had intertextual ties with the sexual abuse paper written one year earlier: Barbara noted that abusive parents tend to overreport behavior problems of children. But it also had ties to the paper on depression in women written two years earlier, as Barbara pointed out that maternal depression was another variable that might bias mother's reports.

The statistical method she tended to favor in her body of work was correlation analysis, which she attended to even in her first paper (a footnote contrasted correlation and causation). In a Research Methods class, she reported "A Correlational Study of the Components of Sensitivity." In the paper on PMS,

she tested for a negative correlation between optimism and PMS symptom reporting. And for her Honors Thesis, her paper reported her correlational study: "Guardians and Children as Sources and Targets of Behavioral Assessments: A Study of Correlation, Correspondence, and Treatment Effects."

In the paper on sex roles a major point in her discussion was how the female role differs across cultures. She made use of a report by Milner (1949) comparing American and Samoan adolescent women, when she pointed out that the Samoan girl, in contrast to the American girl, does not experience the "tension and fear of her community," is not forced to "supress her impulses," and has no "conflict between inner and social demands." She used a quotation and a table from that source. The quotation presenting the Samoan perspective is as follows:

> Life was never very difficult for me.... If I am momentarily angry or disappointed there is always some relative nearby to whom I can go and get understanding and a jolly word. My world is simple and orderly and accepting. It allows me to express my emotions freely.... All I want from life is to remain as I am now, a girl with little work and many lovers, as long as possible. (Milner, 1949, p. 309)

In the paper on depression she used an excerpt from the same quotation--"My world is simple and orderly and accepting. It allows me to express my emotions freely" --and the same table comparing American and Samoan adolescents. But she used them to support a somewhat different argument: that female *depression* is linked to cultural factors. She put it this way: "Apparently, the susceptibility to depression varies from culture to culture within the female populations."

Arjun's authoring identity. Arjun's psychology papers show his interest in theoretical issues at the intersections of cogniton, mathematics, and computers. His three major texts were attempts to contribute to theory-building (or theory-testing) by extending or proposing models. In fact, his first long paper, written the spring semester of his freshman year, was a "Simulation of the Spreading Activation Model of Memory Organization." For it he wrote a program to test specific aspects of that model of memory on the computer. This involved building a memory structure and creating an algorithm to spread activation. Related work included one report of a study modeling the learning of declarative knowledge in a CAPS production system and another paper proposing the use of PDP networks (used most often as models of knowledge and memory) to account for phenomena in political science.

Although this work had commonalities in the kinds of topics chosen and methodology employed, Arjun worked with a different theory for each piece. The only specific source cited in two papers was John Anderson's (1976) *Language, Memory, and Thought*, which provided much of the motivation for the "Spreading Activation" paper. In this first paper, Arjun also (boldly) referred to the work of Alan Newell and Herbert Simon when discussing the results of his attempt to simulate Anderson's spreading activation:

> There is one major addition that I feel is definitely worth making: better control of initial activation. On each pass, the user could determine where attention is being focused.... Hopefully, this could lead to the program itself going with and directing the activation down the best (strongest connection strength) routes or the routes which seem closest to a pre-stated goal node. This would be analogous to searching in a problem space, and

might unite the spreading activation model with Newell and Simon's theories.

The major text cited in the "CAPS" paper was Thibadeau, Just, and Carpenter's (1982) report of of a CAPS production system interpreter, which motivated Arjun's study. Anderson's (1976) book was also cited in the "CAPS" paper as a source on adaptive production systems, and Anderson (1985) was cited for a theoretical claim. In the same paper Simon's work was cited again, this time as a source on adaptive production systems--the piece by Anzai and Simon (1979). This paper begins in the following way:

> Psychologists have traditionally approached the issue of learning in production systems by focusing on the acquisition of procedural knowledge. Their investigations have led quite naturally to the formation of adaptive production systems. [At this point Arjun cites four examples, including Anderson and Anzai and Simon before he sets up his issue.] In contrast the issue of learning declarative knowledge in production systems has not been investigated as extensively. This fact is surprising considering the plethora of both theoretical and experimental research during the last thirty years exploring how humans acquire declarative knowledge. I claim that this research has not been instantiated in production systems because, until now, we have lacked the correct production system architecture.

In the "PDP" paper major sources were, of course, McClelland and Rumelhart (1986) and Rumelhart and McClelland (1986), who proposed the PDP theory. In this paper, while trying to show the utility of PDP networks for mathematical models in political science, Arjun was making intellectual connections across disciplines and he was also bringing together the disciplines he was thinking about as communities for his own identity.

What is most notable is that the sources used as points of departure for the three papers are major pieces authored or co-authored by cognitive scientists at CMU--people whom Arjun knew. He worked as a research assistant for Just and Carpenter, and took courses with McClelland and Simon (each of whom was teaching the course for which he wrote the paper citing their work). Through his research and writing he attempted to extend or test aspects of the work of psychologists at CMU. The community he was constructing (and placing himself within) was composed of cognitive scientists, with those at CMU playing particularly important roles. He was connecting himself to cognitive psychology at CMU and was constructing a CMU authoring identity for his work--to some extent the way a graduate student would.

Relationships between Their Disciplinary Identities and Their Authoring Identities

What we found was that, as students develop in disciplinary and discourse knowledge, disciplinary identity and authoring identity can relate in all possible combinations. A student can have both a well defined disciplinary identity and signs of an authoring identity--the case with Barbara, Arjun, and Hiro. Or a student can have an undetermined disciplinary identity but still have signs of an authoring identity--the case of Catherine. Or a student can have a well defined disciplinary identity and little evidence of an authoring identity--the case of Michael. Or a student can have an undetermined disciplinary identity and little evidence of an authoring identity--the case of Lisa.

We also learned, through Arjun, that a student can make a commitment to a major, create a well-articulated possible identity within the discipline, continue to work on it--even when considering an eventual rejection of that construct. The degree of certainty--how possible it is--is not necessarily related to how well articulated the disciplinary identity or the authoring identity.

The Follow-up: Relation of Previous Work to Current Pursuits

Catherine and Lisa

At the end of the 1991-92 academic year, Catherine and Lisa were working in positions that were more directly relevant to their majors in management than their majors in psychology. Catherine was assistant manager for a department store in a small town in eastern Pennsylvania, and Lisa had been working in various public relations and human resources positions in several cities in the Northeast (as her husband was in officer training for the Navy). Since graduation, neither Catherine nor Lisa wrote any papers that she saw as being related to her undergraduate major. Both still had intentions to return to their studies. Catherine would like to go to medical school and eventually become a psychiatrist. She was constructing a somewhat different disciplinary identity than the one she was focusing on the previous year--but it was one that she had considered from time to time as an undergraduate. To her the larger discipline was still inclusive of both psychology and psychiatry, and she would like to be in the latter--focusing her attention on problems of children. Lisa was saving her money so that she could enter graduate school in January 1993 to begin work on a master's degree in counseling. Referring to her map produced in 1991, she said that she still saw herself as being, for the most part, in general psychology but moving then to counseling. She still planned to get her Ph.D. and teach at the college level.

Barbara, Michael, and Hiro

Barbara, Michael, and Hiro were in their respective Ph.D. programs in psychology during the 1991-92 academic year: Barbara and Michael were both in clinical psychology, and Hiro was in counseling psychology. Their places in the discipline, as they perceived those places and portrayed them graphically for us, had changed somewhat from those of the previous year. Their understandings of those niches were more elaborate and articulated--to some extent because of the kinds of papers they were writing for their courses. They were producing bodies of work that were different. As Michael put it, in his graduate program he was writing more as if he were a practicing professional psychologist, whereas he had produced writing as an undergraduate that was more academic.

Barbara, who had portrayed her area, clinical psychology, but not the discipline as dichotomous (research versus practice), now saw the discipline as two big categories: research and therapy--with some overlap. The overlapping area was where she still wanted to be. She noted that the two areas inform each other but are "practically and artificially divided, particularly in graduate school settings." She explained that she really admired people who were able to do both, and she mentioned that her mentor was someone who conducted research but also had a clinical practice. During that first year of graduate school she produced only a few papers. Most of her papers were psychological assessments; she wrote 4 of these. She also wrote a literature review essay on stress, but did not cite any of the sources she had used in her undergraduate work on related topics.

Michael's representation of the discipline was much like the one his sophomore year with three categories. This time he cut the discipline into production, application, and dissemination, and told us that he was "more aware of the gap between research and practice, especially in clinical psychology." He believed that he was in the dissemination part now--taking courses and acquiring knowledge (the knowledge was being disseminated to him)--but he pointed out that he would soon be moving, to some extent, into the application part, when he began clinical assignments. Over the course of the year Michael wrote 11 assessment/treatment reports, one list of diagnostic criteria, one critique, and one family genogram and report.

Quite satisfied with his decision to go into counseling psychology, Hiro was learning more about his specialization during his first year in a graduate program. While he was learning more about counseling psychology, his overall perspective was also growing as he added yet another specialized area to his portrayal of the discipline. During that first year in his graduate program, he produced a formidable set of papers: 2 literature review essays, 6 brief essay responses based on literature, 21 summaries, 4 role-play dialogues (2 with critiques), two professional statements, one client form, a reference list, and a report on his own decision-making process. The most direct link between his previous writing (the body of work on trauma and rape) and his current work was the volunteer work he was doing with support groups at a rape crisis center. He reported to us that, even though he was not going to be a researcher, he would be conducting research for his thesis. The topic might be on a research interest of his thesis advisor.

None of the three had conducted research studies or had written up results of studies for their classes, though both Hiro and Barbara were both planning to write master's theses that would involve research--quite likely on thesis topics aligned with the research agendas of their advisors. Later on, they would be writing their doctoral theses. Michael's program was very much a professionally oriented program--a five year program with a year-long internship. He would be writing a thesis but he did not know what his topic would be.

These three students were becoming literate in another kind of discourse in psychology--the discourse of practice. They were producing practitioner related forms. All three of these students had been aware of such forms, such as psychological assessments, when they were in their undergraduate program. They had encountered them in their practica, but they did not produce them. All three of them had mentioned such forms when asked what kinds of texts psychologists produce (none of the other three students did). In their graduate work they were learning the discursive practices of another subcommunity within the discipline. Each was producing another body of work which would in time, no doubt, reveal intertextual connections through related themes, approaches, and sources--approaches to problems. For Barbara, who wanted to be both a researcher and a practitioner, there might eventually be an authoring identity that cut across both bodies of writing--research issues and her therapy issues.

Arjun

During the fifth year of our study, the only student who was making strong intertextual links with his previous work was the one individual who had decided not to pursue further studies in the discipline of psychology. He was, however, at the time, actively working in psychology. His plans for graduate work included

mathematics and possibly logic. In his conception of how the disciplines relate, he saw mathematics as the foundation for academic analytic approaches to knowledge. After his year as as a programmer for an educational technology project in the Midwest in the 1990-91 academic year, Arjun spent the 1991-92 year working for two funded projects at a university research center in the South. In the latter position, he was more a part of the research team than he had been the previous year, contributing to the projects conceptually as well as through his programming. The 20 informal papers that he wrote for the projects which provided his support were internal pieces--intended for the other members of the research teams to read and, in some instances, use in reports to funding agencies. These papers included responses (summaries and critiques) to research ideas, descriptions of work being done, and proposals for taking a particular kind of direction on a project. There were 9 of these pieces that combined some of the following: summary, critique, description, and proposal. Two additional papers were lists, 3 were system descriptions, 3 more were explanations, 2 were comparisons of models, and one was a manual. In addition to these produced for projects that he was on, he also wrote 2 critiques for projects that he was not on. And he produced 4 additional texts on his own: a manual for data collection software, a theoretical proposal for universal architecture based on CAPS, and two comparisons of Newell's and Anderson's architectures.

His "cognitive science identity" and "CMU identity" are apparent in several of his writings over the course of the year. These included a critique that he wrote for a project he was not working on. He actually cited Rumelhart and McClelland (1986) in response to ideas for a project that someone was just beginning to conceive. They also included all pieces he wrote dealing with CAPS production system : texts he wrote for one of the two projects also some pieces he was producing on his own time. These CAPS texts were directly linked to CMU--in particular, Just, Carpenter, and Thibadoux. In his own conceptual work on the CAPS architecture he was also looking to (and comparing) the universal architectures developed by psychologists at CMU, Newell and Anderson.

However, for most of his internal writing he did not cite the literature except to make a point. This is how he explained it:

> I don't bother at the beginning reviewing the literature of the field that's related to what I'm discussing. . . . There's sort of this context that's present. . . . And I only bring in outside theories to make a point. I don't cite anything for historical reasons.

Even though he had decided that his career would most likely not be in psychology, he was actively involved in the discourse of psychology and was learning more about ways of writing in psychology. During his last interview with us, he explained that he now thought there were two ways to argue things psychologically: "to account for a bunch of data with a clear theory or mechanism" or "to differentiate between theories by finding the crucial test of experimental data to do that." The first kind of arguing was what he was attempting in his undergraduate program, particularly in his CAPS paper. The second kind of arguing seemed to be what he was focusing on in work for one of the funded projects and in his own theoretical work.

Conclusion

The first phase of the study tracked the development of six students over a five-year period as they were learning about their discipline and as they were beginning to create their disciplinary identities. It shows all of them over time making changes, some gradual and some dramatic changes, in their representations of their discipline by redrawing the boundaries around or within it. As they made changes in their conceptions of the discipline, they were also reconceiving, to some degree, the nature of their places in it. The first phase also tracked the development of the students in producing discourse relative to their discipline--development of their authoring identities. The number of papers produced over the undergraduate years averaged 15 papers. In some of their bodies of work there were signs of what we called emergent authorship--signs that the writer was creating a body of work interconnected through thematic links and connected with a community of scholars pursuing similar work. Some of the students, but not all, were doing just this--using source material and making transformations in the material across texts and across courses to make it work for new purposes. We looked at authoring identity relative to disciplinary identity. This phase suggested that a student might have a well-defined disciplinary identity but not authoring identity or might have beginnings of an authoring identity but still be unclear about a disciplinary identity.

The study focused on the writing of academic (research-oriented) discourse in psychology because that was what the students were reading and producing for the most part during their undergraduate careers. Because of the follow-up the fifth year, we were able to see in the work of one student who went into a research position how the intertext begun earlier can continue to develop. Also because of the follow-up the fifth year, we were also able to give some attention to another discourse in psychology--the discourse of practice--a discourse that is not often given much attention by people studying the rhetoric of the disciplines. Writing in psychology is often portrayed as rather uniform--scientific writing following the "authority" of the APA manual (Altman, 1987; Bazerman, 1987). When this phase of our study ended, the three students going into clinical and counseling psychology were learning to produce other forms, such as psychological assessments, for the practice of professional psychology. They were building more knowledge about the ways of psychology.

Acquiring Discourse Knowledge for Writing and Learning
Study 1. Development of Discourse Knowledge:
Phase 2. Cross-sectional Phase

The purpose of this cross-sectional study is to provide converging information for the five-year-long longitudinal study we conducted on writing in psychology. We were interested in gathering impressionistic reflections on writing in the discipline from first-year students, third-year students, graduate students, and professors to supplement and enrich our analyses and discussion of the students' development and changes over time in their approaches to writing in psychology. Our study was guided by three questions:

How do first-year students, third-year students, graduate students and professors compare in their perceptions of their discipline?

How do these four groups compare in their descriptions of how meaning is built in disciplinary texts?

How do these four groups compare in their concepts of authorship and authority in their discipline?

Method

Participants

Ten first-year students, ten third-year students, twelve graduate students, and nine professors from the Department of Psychology at Carnegie Mellon University participated in the student. At each level, the participants form a representative group from the department. Specifically, 10 of the 29 (or 35% of the) first-year students who indicated that they planned to major in psychology, 10 of the 21 (or 48% of the) third-year students who were majors in psychology, 12 of the 35 (or 34% of the) graduate students in the Ph.D. program in psychology, and 9 of the 22 (or 45% of the) faculty in psychology agreed to participate. Each group is profiled below.

First-year students. Four male students and six female students comprised the first-year student group. Most of the first-year students told us that they decided to study psychology while they were in high school, and eight pointed out that they were drawn to the field because they found it "interesting" or "more personal than other fields." Only two students report being attracted to the field for the career opportunities it might present. Most of these students seemed to be well informed about the the psychology department at CMU, and seven reported that they specifically chose to come here because of their the reputation of the department. All of the students, who were in the second semester of their first year, had taken one core course, Cognitive Processes, in psychology, and four students had taken a second course in the discipline. A majority of the students reported being 75% or more committed to majoring in this discipline. And all of these students reported that they plan to go to graduate school, though it is not clear how many plan to stay in psychology. Two noted that they were still not sure whether they wanted to become psychologist. Of the eight who were planning to enter the field, five reported that they want to work in a clinical setting (e.g., as a school counselor, or as a clinical or social psychologist), the other three reported that they also want to go into some kind of practice. In sum, most of the first-year students described career paths that would put them in a clinical rather than academic setting.

Third-year students. Five male and five female students comprised the third-year student group. Like the first-year students, a majority of the third-year students reported having chosen to study psychology for personal reasons--because they found it "interesting," "fascinating," and/or "puzzling." Only three of these students described their choice of study in terms of a career move. For example, one student wanted to study psychology to prepare for "becoming a medical attorney." Most of the students in this group reported that they did not decide to major in psychology until their sophomore year; just a few had decided on this major while they were in high school. Interestingly enough, the third-year students seemed to have been less informed than either the first-year students or the graduate students about the Psychology Department before coming to CMU. However, the fact that so many (seven) did not decide on a major until they had been in undergraduate courses for two years may account for this lack of prior knowledge. During their three years at CMU, these students had taken an average of seven courses in psychology (range of 4 to 9 courses per student). All reported having taken the core course in cognitive processes and at least one research methods course. While some of the students described having taken courses from the three different areas offered in the Psychology Department, cognitive, social, and developmental, others seemed to have focused their coursework on one of the three. Like the first-year students, most of these students tended to describe plans for obtaining positions as practitioners rather than researchers. Also like the first-year students, all of the third-year students stated that they planned to go to graduate school, though not all of them plan to stay in psychology. One plans to go to chiropractic school, another to law school, and still another to medical school. Only two mentioned wanting to study for a Ph.D. in psychology.

Graduate students. Seven male and five female graduate students, ranging from the first to the fifth year in the Ph.D. in Psychology program, comprised the graduate student group. More specifically, one first-year, three second-year, five third-year, two fourth-year, and one fifth-year participated. Most of the graduate students reported being drawn to psychology because they were intrigued by the problems and issues in the field. For example, one student wrote, "I found the questions psychology asks to be interesting in that I actually wanted to know the answers (to the extent there are any)." Only two graduate students reported entering psychology for career reasons. One, for example, reported being drawn to the discipline because it "seemed to offer a range of options: research, teaching, clinical practice, and corporate consultation." Most reported making a decision to study psychology while they were in their first or second year of college, and three while they were in high school. In fact, all but two of the students reported having majored in psychology and having taken an average of 13 courses in psychology as an undergraduate (range of 8 to 20 courses). But only two of the twelve graduate students had done any graduate work before coming to CMU, one for an MA in social sciences and the other for an MA in educational psychology. Ten of the twelve graduate students reported coming to the graduate program in psychology at CMU because of the department's reputation and/or because of the work of specific professors as well as the particular kind of research done here. As might be expected, the graduates students appear to have been well informed about the department and the program before they began their graduate studies. The graduate students reported having taken an average of 7 graduate courses in psychology at CMU (range 5 to 11 courses). All reported having taken at least one methods course. As for their future, unlike the undergraduate students, most all of the graduate students reported that they plan to do research and teach in a university.

Professors. Eight males and one female comprised the faculty group; six are professors, two are associate professors, and one is an assistant professor. Their specializations represent the range offered by the department; five are cognitive psychologists, three are social psychologists, and one is a developmental psychologist. All but two reported having chosen to study psychology either while they were in high school or in their first year as an undergraduate; the other two came to psychology from other fields (one from business and the other from political science). All of the professors described having been drawn to the discipline of psychology because they found it fascinating or a useful way to explore the problems that interested them. While two reported that they did not do their graduate work in psychology, the rest cited a diverse group of graduate institutions where they completed their graduate studies with dates of attendance ranging from 1961 to 1992. Thus, the faculty have been in academia from one to 30 plus years. All but one mentioned that they were attracted to the department of Psychology at CMU because of the nature of the department (the kind of work it does, the quality of the department members and publications, and the reputation). One professor, however, had first come to CMU not to work in psychology but to help organize the business school. The professors have been at CMU on average for 14 years (range of 43 years to less than one year). All but one of the professors teach regularly. In addition to teaching courses in their areas of specialization, seven of the nine professors reported teaching methods courses (three in cognitive psychology, two in social psychology, and two in developmental psychology).

Data Collection Procedure

The participants filled out a questionnaire designed to elicit their descriptions of the discipline of psychology, the roles writing and authoring play in the discipline, and their experiences with authoring in the discipline. Three versions of the questionnaire were prepared--one for undergraduates, one for graduate students, and one for professors. Most of the questions were identical on all three versions, with only a few questions differing minimally to make them appropriate for each group. For example, whereas the undergraduates were asked "Do you plan to go to graduate school?," the graduate students were asked "Before coming to CMU, had you done any graduate work in psychology? If so, what kind of work, where and when?" And the professors were asked "When and where did you do your graduate work in psychology?" Similarly, for example, the undergraduates and graduate students were asked "What psychology courses have you taken?" By contrast, the professors were asked "What undergraduate and graduate psychology course do you teach?" (See Appendix B for a copy of each questionnaire.)

Discipline explanations. To gain insight into how each group perceived of the discipline of psychology, we asked them to define psychology and to write a brief essay in response to the following prompt: *People in academic disciplines, such as psychology, sometimes reflect on the nature of their particular discipline. What is the nature of the discipline of psychology? What makes it unified and what makes it unique from other disciplines?* The focus of each essay was coded for one of the five following emphases:

1. Object of Study--discussion focuses on the object of study (e.g., the human mind) in psychology that distinguishes it from other disciplines and/or unifies the discipline

"Clearly, the object of study distinguishes most disciplines form one another. Psychology can be distinguished from several disciplines simply by noting that psychology is about the mind"

"It is unique in that we use the object of our study to observe the object of study"

2. Methodology--discussion focuses on the methodology (e.g., empirical) in psychology that distinguishes it from other disciplines and/or unifies the discipline

"Since it deals with behavior of people, it is rare to have research that is 'pure' in the way that particle physics is thought to be"

3. Sub-Areas--discussion focuses on the different "camps" or sub-divisions that comprise psychology to show how it is or is not unified and how it differs from other disciplines

"I see psychology as having a number of branches such as cognitive, social, developmental, personality, animal, industrial, experimental, neuro-, organizational, counseling, school, clinical, etc. Another classification is academic psychology (see dev. & cog.) and practicing psychology (clinical)."

4. Application--discussion focuses on how psychology is used beyond the academic discipline (e.g., to treat patients or to provide lay people with self-help)

"Psychology is unique in that it can be applied to everyday use."

5. Personal--discussion focuses on how the participant plans to use psychology or on attempts to locate him/herself in the discipline or on the source of his/her understanding of the discipline

"For me, psychology is unique in that it is the only discipline in which I can use my own knowledge combined with those around me to discover more about the way I fit in this world"

"What makes it unique for me is that I plan on using this knowledge in this future as a medical attorney with emphasis on patient's rights, medical ethics, etc."

Graphic representations. As a means of gaining additional insight into how the participants perceived of the discipline, we asked them to produce a graphic representation in response to the following prompt: *Please draw a sketch (a map, tree, diagram, etc.) of how you perceive the organization of the discipline of psychology.* They were then asked to write a brief essay to explain their drawing and another to describe where in the drawing they would locate themselves. The maps were coded for the kind of sketch (e.g., flow chart, tree diagram, hierarchical tree, cluster constellation, interrelated boxes) and for the kind of elaboration contained in the sketch (e.g., whether it depicted 1) the function of the discipline, 2) content in the discipline, 3) object of study, or 4) process of becoming a psychologist).

Writing in psychology. The participants were asked to respond to a series of prompts concerning the kinds of writing psychologists do. The questions were designed to elicit their knowledge of and experiences with various genres in

psychology, their understanding of the kinds of evidence that are appropriate and effective in the discipline, and their concepts of authority in psychology writing.

Reading psychology texts. To gain an understanding of how the participants *read* psychology discourse--that is, what the participants look for in a psychology text to convince them of its validity--we asked them to respond to two prompts: *How can a psychologist convince you as a reader about particular information, ideas, or claims that he or she makes in a piece of writing?* and *How can a psychologist convince you as a reader about particular information, ideas, or claims that he or she makes in a piece of writing?* Their responses were coded for one of two kinds of proofs. The first, what Aristotle called *inartistic proofs* are those kinds of evidence that come from outside of the writing (e.g., evidence from previous or current studies, examples drawn from previous work, and statistics). The second kind, what Aristotle called *artistic proofs*, emerge from the processes of constructing an account (e.g., logical argument and clear organization).

Forms of discourse in psychology. To elicit information about how much experience with and knowledge of various genres in psychology, the participants responded to two prompts. The first prompt asked them to identify the kinds of writing psychologists do. The responses to this prompt were tabulated by the forms named (e.g., research article, literature review, grant proposal). The second prompt asked them to name the kinds of writing they considered most important in psychology and to explain why. Again, the forms named were tabulated and the reasons given for why particular kinds of writing were important were coded for one or more of the following:

1. Contribution to Knowledge

"The focus of the discipline on using data to infer the basis of mind and behavior make it crucial that the results of scientific research be communicated accurately and effectively in a form that allows other workers to evaluate and build upon the work of others."

2. Education within Discipline

"Text books are most important in my opinion because they include not only the basic elements of teaching in Psychology but also individual research and studies in their particular field of study."

3. Education of General Public

"I would say 'instructional' because those are the documents that are accessible to the general public. . . . Psychology is really interesting and integral to coping with ourselves and our world. It can't help if it doesn't reach that world."

4. Provides an Outlet for Writer

"Explanatory papers because it gives the writer the opportunity to explain their views and tell what they think about a certain area."

5. Personally Interesting

"I understand the importance of research but I find philosophical writing much more exciting and satisfying. There is something about tackling the really big

issues in life that really stimulates my thinking. I may never be able to solve these issues but I think every time I try I come a little closer to truth."

6. For Tenure and Promotion

"In the academic field of social psychology, journal articles are most important. They are important for hiring decisions as well as tenure decisions."

7. Depends on Purpose and Audience

"Each has its own purpose. The importance (or appropriateness) of the type of writing depends upon the goal of the author and the reader."

Experience in writing in psychology. To gain a sense of the amount of experience the participants had in writing in psychology, they were asked to list the kinds of writing they have done in the discipline. Their responses were tabulated by the various kinds of genres they reported and their answers were examined for how they described the writing (e.g., by topic or by form or by both).

Writing assignments in psychology. To gain an understanding of the role writing plays in disciplinary courses for both students and professors, we wanted to compare how students perceive the reasons for writing in psychology classes with those that psychology professors give for assigning writing. To this end, the students were asked to respond to the following prompt: *University faculty teaching psychology courses often use writing assignments in their classes. What reasons can you think of for why professors (or instructors) have students do writing in their psychology classes?* And professors responded to this prompt: *If you assign writing for your courses, please explain your reasons for having undergraduate and graduate students write in your courses.* Each reason named was coded according to the following five categories: epistemic, apprenticeship, skillsmanship, testing and critical thinking.

1. Epistemic--to help students master content

"Writing research papers is definitely beneficial for students. It is boring but it sort of forces you to learn about the information."

"I assign writing to get the students to have a deeper understanding of the topics they read about and hear discussed in class."

2. Apprenticeship--to give students practice and experience in writing in the discipline

"Because if you are going to pursue a job in psychology, it is most likely that you will be publishing studies"

"As for graduate students, the issue is simple; if they can't write well about their investigations, they never will have an impact and the students will never be successful professionals in the field."

3. Skillmanship--to develop writing skills

"Primarily because undergraduates write so poorly that their writing is often impossible to understand. Someone has to help these people learn how to write."

"The writing is . . . in part a vehicle for teaching students to communicate their ideas to others succinctly."

4. Testing--to see whether students have master content or skills

"Perhaps to understand their level of cognitive knowledge and to see how well they understand the material they are researching. It may also be a way of examining their system of research methods."

"In order to evaluate the students' thinking skills. The teacher wants to know whether the student can use the skills and material learned in the class to reason and argue in that field."

"to assess the logical structure of a student's argument"

5. Critical thinking--to develop critical thinking skills

"practice in learning how to think critically"

"I think it is important because it gets students to think about issues and synthesize a position"

Authority in psychology writing. We were also interested in where the participants located authority for making claims in the discipline. Thus, they were asked to respond to the following prompt: *What gives psychologists the authority to make statements about psychology?* Each statement was coded according where the authority was located (within or outside of the writer) and the kinds of authority listed:

Inside the Writer

1. Knowledge:

"they have studied the field for a number of years and are very knowledgeable in terms of knowing what psychology is and how it occurs in the world around them"

2. Experience:

"Experience in the field"

3. Analytical Mind:

"an analytical way of thinking"
"construction of theoretical accounts that fit the existing data"

4. Dedication to/Interest in Field:

"The fact that they are concerned and care about the issues they study."

Outside of the Writer

1. Reliable Data & Empirical Evidence:

"the empirical results"
"experimental evidence"

2. Statistics:

". . . statistical analyses that indicate that it is reliable and repeatable"

3. Quality of Research:

"quality of research"
"demonstrated competence to design, execute and interpret experiments"

4. Presentation of empirical evidence:

"The presentation of empirical evidence (gathered by themselves or others)"

5. Journal editors/peer review system:

"Every psychologist does not have the same authority as every other psychologist to make statements about psychology. Generally, it is editors of psychology journals that give psychologists (or other writer) the authority to make statements about psychology, not psychological credentials, per se. Many non-psychologists (such as Herb Simon at CMU) have a great deal of authority in their psychological statements."

"peer review structure"

6. Institutional Affiliation:

"backed up by a large institution"

7. Reputation of Psychologist:

"his status, if he is famous, people listen"

"Psychologists who have a track record of making well supported claims can become authorities in their area of expertise"

Results and Discussion

One of the problems with self-reports, such as responses to items on a questionnaire, is that the reports cannot possibly include all that an individual thinks or believes. Some of our participants pointed out overtly that they did not include all they knew or believed. For example, when asked to sketch the discipline, one professor wrote: "This is a nearly impossible task. The main problem is the multidimensional nature of the structure of the field. So what follows is pretty superficial." Another focused his discussion on experimental psychology only because he "didn't want to spend all night doing this." We, therefore, do not claim

that the answers we received are comprehensive or exhaustive. Another obvious limitation to our study is that participants are from a single institution and, thus, we do not claim that their answers necessarily reflect the discipline at large. Nevertheless, the responses do provide some use useful and interesting patterns that point to some of the differences between the undergraduates, the graduate students, and the professors. As such, they provide an important starting point for an examination of how these various groups perceive of authoring in the discipline of psychology.

How do first-year students, third-year students, graduate students and professors compare in their perceptions of their discipline?

Definition of psychology. All four groups offered remarkably similarly definitions of psychology, most defining it as "the study of the human mind," others as "the study of human behavior," and still others as some combination of mind and behavior. For example, one professor wrote, "The study of the human mind and brain, and (in applied and clinical psychology), the application of that knowledge to human affairs." Another professor wrote, "it is the study of what goes on inside the brain/mind during behavior. This includes brain processes as they relate to behavior." Similarly, a first-year student wrote, "the study of the human mind and human nature, focusing on thought processes, predictable patterns of human behavior, mental and personality disorders and the physiology of the brain." In short, the definitions tended to be broad but compatible across all four groups. One could argue perhaps that since these groups are from the same department, it may not be unusual that they share a similar definition. While this may be true, it does account for the disparate responses we received when we asked the participants to reflect on the nature of the discipline of psychology.

Interesting to us was the length of the graduate students' definitions. Although the other groups tended to respond in single sentences, graduate students' definitions were longer, averaging four sentences.

Verbal explanations of the discipline. When asked to reflect on the nature of the discipline of psychology and to consider what makes it unified and what makes it unique, the participants provided a wide range of answers which tended to focus on one or more of the following five characteristics: object of study, methodology, sub-areas, application beyond the discipline, and personal definitions and locations. As Table 1 below shows, whereas undergraduates responses ranged across all five areas, graduate students and faculty only mentioned the first three. Since the first three aspects are most closely associated with academic research in psychology, the work graduate students and faculty are most involved with, it is perhaps not surprising that their responses would fall into these categories. Consider, for example, that whereas methodology was discussed by two-thirds of the faculty and one-third of the graduate students, only one first-year and one second-year student mentioned it. On the one hand, methodology is undoubtedly of great concern to both graduate students and professors in their day-to-day work. On the other hand, one possible reason that undergraduates were less apt to give this answer may by that they simply are not be aware of the methodological lines that draw different camps within the discipline; these issues are probably not foregrounded for students (cf. Graff, 1987). By contrast, undergraduates tended to consider application beyond the academic discipline as well as their personal location within the field as often as aspects that characterize academic research. Given that most of the undergraduate reported that they plan to enter clinical practice of one sort or another, it may not be surprising that they would focus on applications beyond the

academy. Particularly striking, however, is that 4 out of 10 first-year students and 6 of the 8 third-year students who answered this question (2 did not answer it) related the discipline to themselves whereas none of the graduate students or professors did so. Perhaps as these students are moving to take a place in the field (with the latter group looking at graduating and entering the professional world within the following year), they are struggling with personal issues, so the personal is foregrounded. It may be possible that faculty who are established members and graduate students who feel more like established members (albeit novices) in the field, do not address their location in the discipline because it simply is not an issue at this point in their career.

Table 1: Disciplinary Explanations

	Fr.	Th.	Grad	Fac	Total
Object of Study	5	4	11	8	28
Methodology	1	1	4	6	12
Sub-areas	1	--	4	2	7
Application	2	3	--	--	5
Personal	4	6	--	--	10

Graphic representations of the discipline. In addition to verbal explanations of the discipline, we were interested in how the participants would graphically represent it. The sketches drawn by the participants were examined for the kind of sketch drawn as well as the focus of the sketch. Interestingly enough, the groups did not differ appreciably in the level of complexity or the amount of detail included in their graphic representations. Rather, levels of complexity and detail varied within subject groups but not between. What did distinguish the groups to some degree was the form used for and the focus of the sketch. Table 2 displays the forms used and Table 3 displays the focus (or organizing principle) of the sketches.

Table 2: Form of Disciplinary Sketches

	Fr.	Th.	Grad	Fac	Total
Flow Chart	--	2	1	1	4
Tree Diagram	4	3	4	2	14
Hierarchical	--	--	3	1	4
Cluster Constellation	4	3	2	2	11
Interrelated Boxes	1	1	1	2	5
Other	1	1	1	1	4

The tree diagram and the cluster constellation were the two most frequently used form; the other three patterns were used in equal proportions. Perhaps because the "tree diagram" was cited as an example in the directions for this task, some participants may have been cued to use it. The frequency of the other forms though is somewhat interesting. Also worth noting that most of the participants chose to represent all the elements in their sketches equally rather than hierarchically. Note that only three graduate students and one faculty member chose to present the discipline in hierarchical terms. Since a hierarchical form assumes a fair amount of knowledge about a subject, perhaps the reason only faculty and graduate students chose this form is because they are more knowledgeable in psychology. Table 3 below displays the focus of the sketches.

Table 3: Focus of Disciplinary Sketches

	Fr.	Th.	Grad	Fac	Total
Function	2	--	6	3	11
Content	3	5	4	5	17
Object of Study	4	3	2	1	10
Process	1	2	--	--	3

The most common focus of the sketches was the content of the discipline, followed by the function (e.g., basic research vs. applied vs. clinical practice) and by object of study (e.g., mind, behavior, and social groups). Faculty focused more often on the content of psychology as did third year students whereas graduate students focused more often on the function of psychology and first-year students focused more frequently on the object of study in psychology. Only undergraduates depicted the process that one goes through to become a psychologist.

To provide a better sense of how participants drew the discipline of psychology, we have provided a few samples below of some of the forms and focuses.

Function: The sketch below, drawn by one of the professors, depicts psychology in terms of two main branches: academic and professional. He further delinates each branch by the according to the function of each.

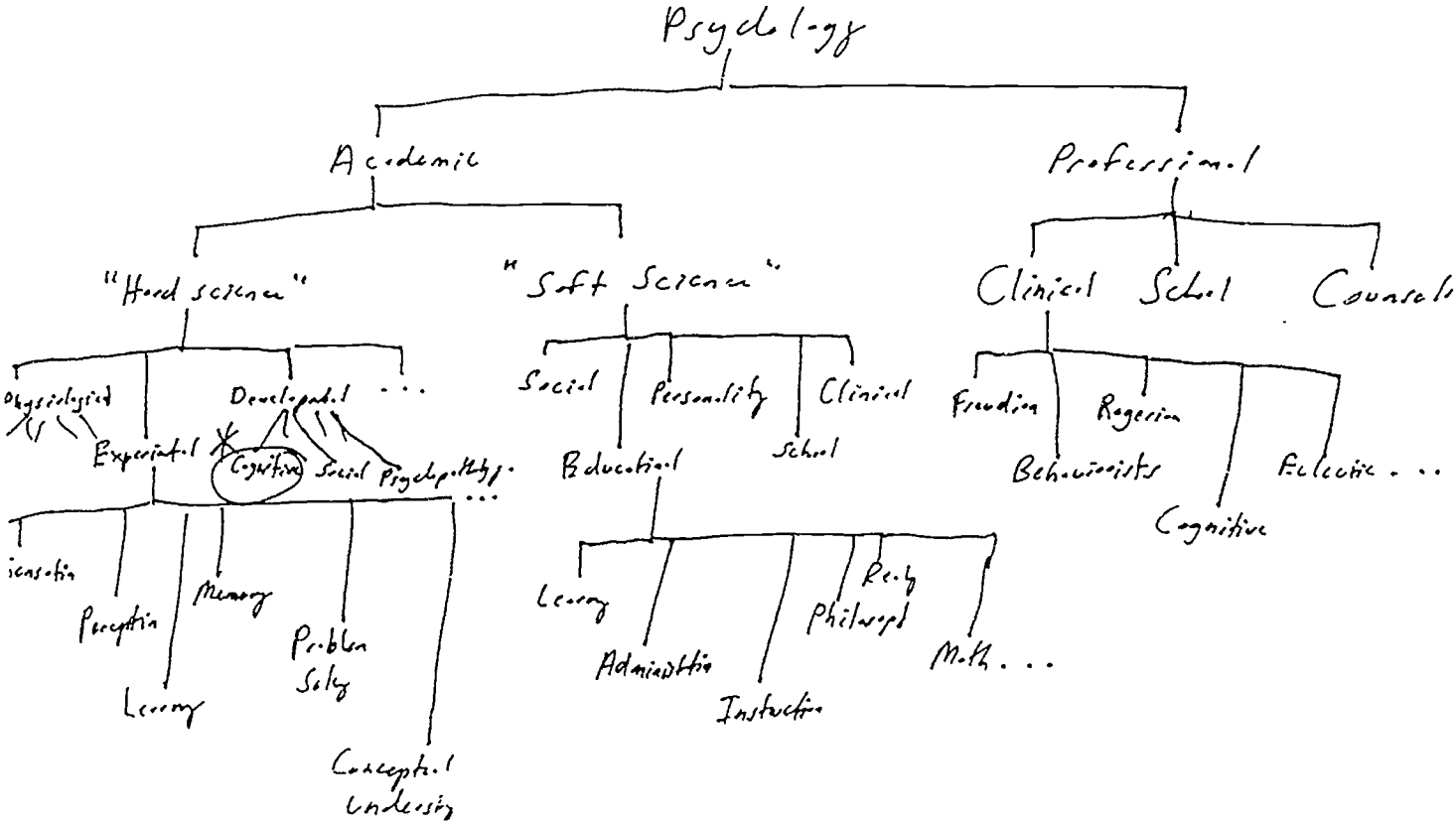


Figure 1. Psychology as two branches

Content. The following sketch, drawn by a graduate student, depicts the psychology according to the areas of content, or in his words, the "topics."

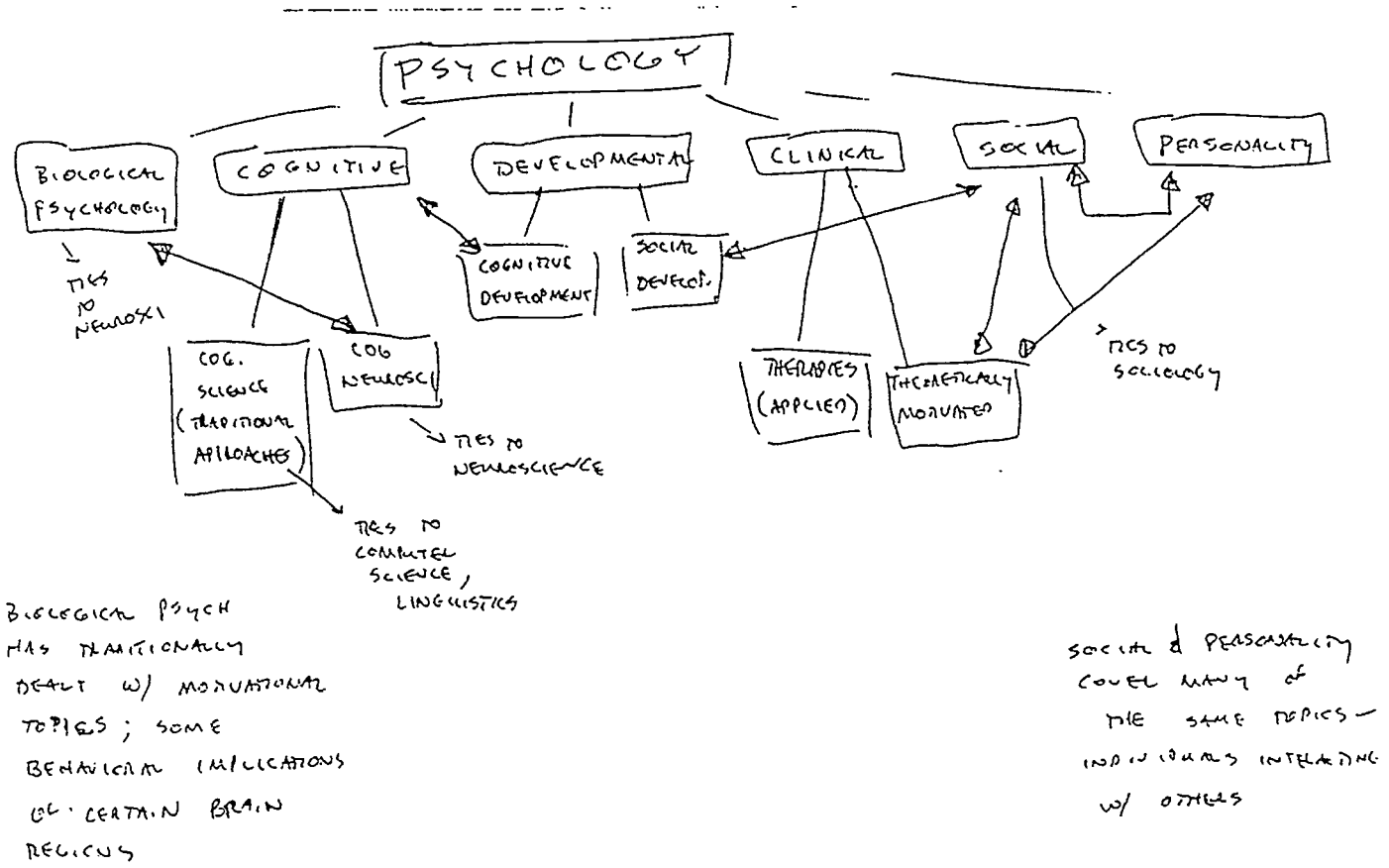


Figure 3. Psychology as areas of content

Object. The following sketch, drawn by a third-year student, is organized according to the objects of study of each branch of psychology. At each point in the star, this student identifies the central object of study (e.g., environment, mind) and the lines leading to the point identify the areas of psychology the primarily are concerned with each of the objects. Thus, he ties social and behavioral psychology with environment as their primary object of study.

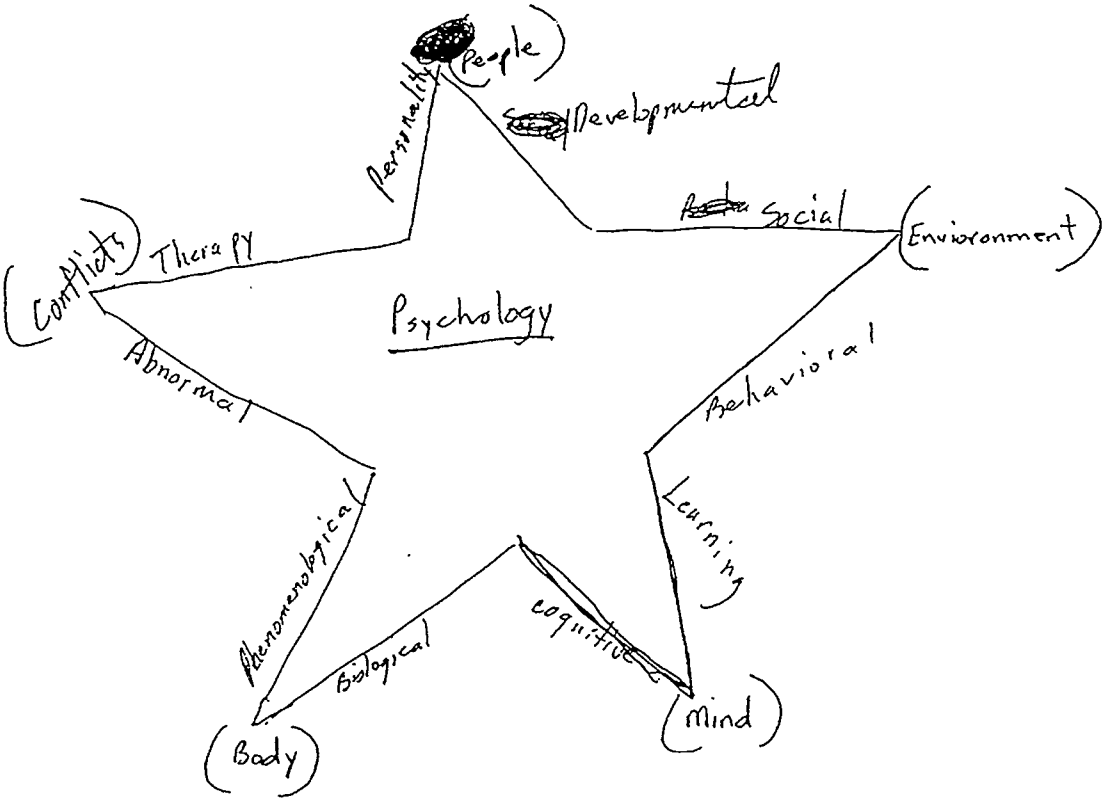


Figure 3. Psychology according to objects of study

Process. The last sketch, drawn by a first-year student, depicts the process, as this student sees it, of becoming a psychologist. He begins with student at the top of the chart and shows how over time and with experience one ends up a psychologist.

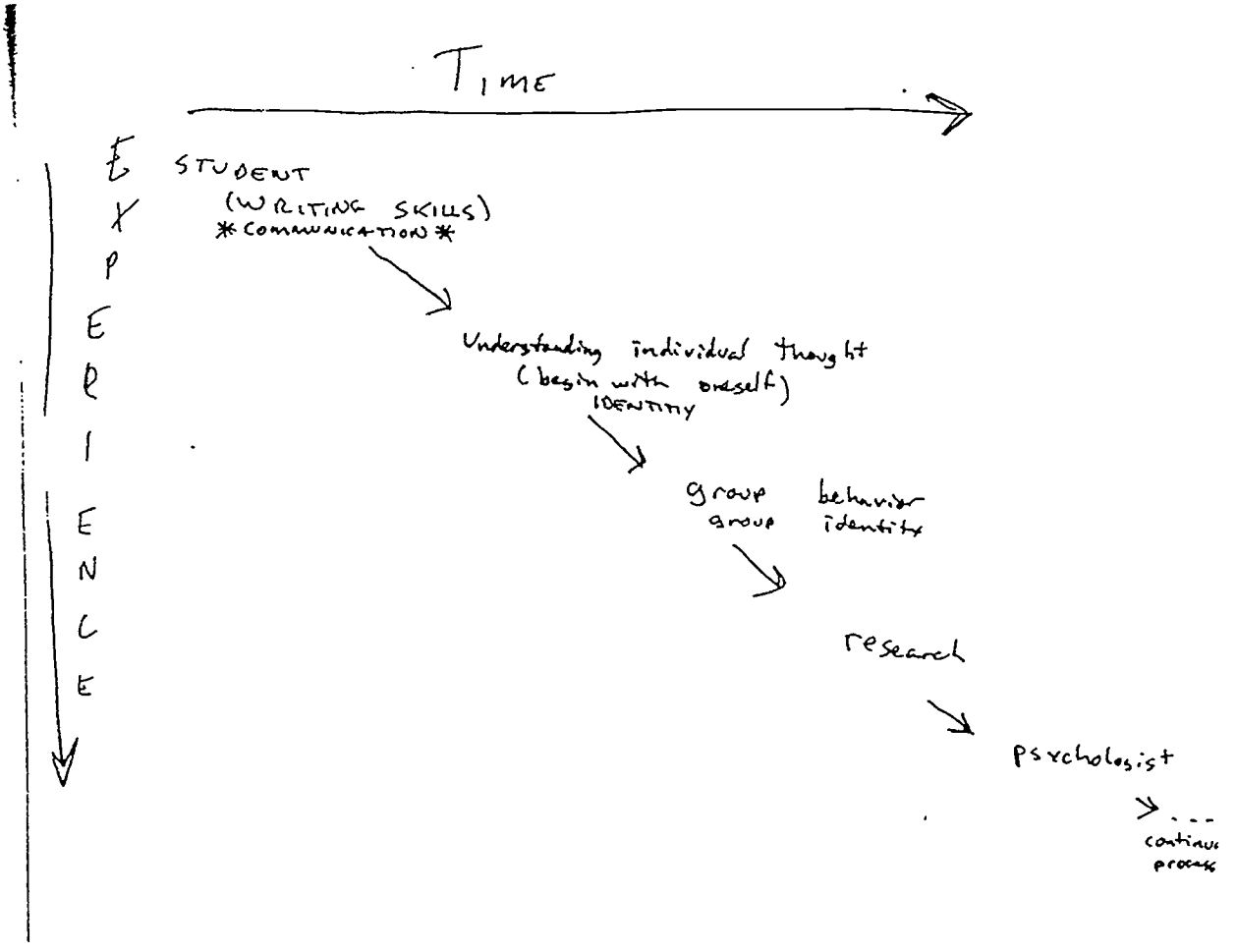


Figure 4. Psychology as process

Taken together, the responses to the three above three prompts revealed increasing diversity between and within groups. This diversity calls attention to the point that psychology, like most academic disciplines, is not homogeneous. As one professor pointed out, "Psychology is not unified. The clearest evidence of this is in the creation of the American Psychological Society as an alternative society for psychologists dissatisfied with the central professional organization of psychologists, the American Psychological Association." The richly complex and multi-dimensional nature of the discipline is manifested by the variety of responses that emerged from people who are located in the same institution. That is to say, that what is interesting here is not so much the variety between the four groups, though clearly the answers revealed some different points of emphasis, but rather the differences within groups, for it problematizes the processes of learning in a discipline and points to the complicated task students have in coming to grasps with a discipline.

One of the areas, of course, that students must grapple with in disciplinary courses is learning how to read and write within the discipline. The next sections deal more specifically with the role of discourse in the discipline of psychology.

How do first-year students, third-year students, graduate students, and professors compare in their descriptions of how meaning is built in disciplinary texts?

One aspect that separates disciplines is the kinds of evidence that is deemed acceptable. We asked our participants how psychologists can convince them as readers about particular claims, and what kinds of evidence psychologist use. As Table 4 below shows, there was a clear difference in how the four groups responded to these two questions. Undergraduates tended to cite *inartistic proofs* (evidence from outside the writing) far more frequently than *artistic proofs* (those created during the process of writing). By contrast, graduate students and faculty considered both kinds of proofs in almost equal numbers. Furthermore, undergraduates (particularly the first-year students) tended to use vague terms such as "support" or "believable theory," terms that could be applied to any field. The graduate students and faculty were far more specific. For example, one professor wrote: "Basically, the psychologist has to show that the methods used were sound, that the inferences from results to conclusions are compelling, that there are no artifacts, that competing interpretations of findings have been considered and that the research has been done to take these into account."

Table 4: Summary of Elements That Convince

Inartistic Proofs		**Fr.**	**Th.**	**Gr.**	**Fac.**	**Total**
evidence from previous studies	2	3	4	1	10	
evidence (data) from current study	4	5	8	8	25	
sound research design	--	4	4	2	10	
statistics	1	5	2	--	8	
facts	1	1	--	--	2	
examples	2	1	--	--	3	
"support"	2	1	--	--	3	
"believable theory"	1	--	--	--	1	

Artistic Proofs					
valid inferences	--	--	1	1	2
shows rival hypotheses	--	--	5	2	7
logical argument	1	1	5	5	12
clear argument	--	2	3	4	9
clear organization	--	--	1	--	1
interesting writing style	--	--	1	--	1
concise argument	--	1	1	--	2
clear writing	2	1	3	--	6
Ethos of the Writer and/or Affiliation	1	1	--	--	2

For both groups, evidence (either from other studies or current data) is important. The second most important aspect or element (particularly for faculty and graduate students) is a logical argument. Two elements tied for the third most commonly cited element, namely, evidence from previous studies and a sound research design. Clearly, the graduate students and faculty put more emphasis than did undergraduates on the quality of the writing for convincing them of claims. Finally, two undergraduates mentioned the level of expertise or the reputation of the writer and his/her institutional affiliation. Although graduate students and faculty did not cite these as elements that convince them, they did point to them in their response to the question that asked them to identify the elements psychologist use to support their claims.

A comparison of the participants' responses to the two questions (e.g., what convinced them and what psychologists use to convince) raised an interesting point. While several faculty saw a connection between the two questions, and simply stated "see answer above," others (particularly undergraduates) treated them as two separate questions. This disparity suggests that there may be difference in what the participants believe is needed to convince them and what they actually see in the psychology literature. Most striking is that far fewer responses to the second prompt point to quality of writing. Indeed, several graduate students and a few undergraduates complain of the lack of clarity in the literature. If this is the case, then perhaps the respondents did see a difference between the "ought" and the "is" in the literature in psychology. Nevertheless, the pattern that occurred in the responses to the former question was repeated in the responses to the latter question, namely, undergraduates tended to cite only *inartistic proofs* whereas graduate students and faculty list both *artistic* and *inartistic proofs*.

Forms of discourse in psychology. How can the differences in the above responses between groups be accounted for? One obvious answer is that the four groups of participants have had different levels of experience with and, thus, familiarity with literature in psychology. This range became apparent to us when the participants were asked to name the kinds of writing that psychologist do. As Table 5 below suggest, graduate students and faculty named far more different kinds of writing than did the undergraduates. Specifically, undergraduates did not mention as many kinds of disciplinary or professional genres as did graduate students and faculty.

Table 5: Types of Writing Psychologists Do

	Total	Fr.	Th.	Gr.	Fac.
A. Research					
1. Books (chapters and monographs)	1	4	7	8	20
2. Journal Articles	4	5	10	5	24
3. Technical Reports	3	1	5	4	13
4. Conference/Colloquium Papers	--	--	3	--	3
5. Descriptive Reports of research in progress	--	--	1	1	2
6. Other ("studies" & "academic")	2	3	--	1	6
B. Theoretical					
1. Books (chapters and monographs)	1	--	3	1	5
2. Journal Articles	2	--	3	1	6
C. Other Disciplinary Writing					
1. Methodological Books and Articles	--	--	3	1	4
2. Edited Volumes	--	--	1	--	1
3. Literature Reviews	1	1	7	3	12
4. Book Reviews	--	--	--	1	1
D. Pedagogical					
1. Textbooks	1	1	3	5	10
E. Professional					
1. Research Proposals	--	2	1	1	4
2. Grant Proposals					
3. Cover letters (for articles, proposals, etc.)	--	1	4	2	7
4. Request letters	-	--	1	--	1
5. Professional correspondence	--	--	1	1	2
6. Policy Statements	--	--	--	1	1
7. Clinical notes on patients	--	1	1	1	3
8. Clinical reports	2	1	1	1	5
F. Popular					
1. Books (self-help, inspirational)	2	3	4	3	12
2. Magazine articles	1	--	1	3	5
3. Fiction, Diaries	1	2	--	--	3

By far the most common response to this question was "research article," with over half of the participants giving this answer. This was closely followed by "research book," with half of the participants naming this type of writing. Technical reports, literature reviews, and popular books, and textbooks followed. The groups varied, however, in their responses. First-year students and third-year students named far fewer professional and other disciplinary kinds of writing than did graduate students and professors. For example, the first-year students did not mention professional writing (e.g., research or grant proposals, professional letters, etc.), and only one mentioned the literature review; no other "other

disciplinary" writing tasks were mentioned. Similarly, few of the third-year students mentioned disciplinary or professional writing outside of research and theoretical writing. Perhaps this is a sign of the kinds of reading and writing tasks they have been exposed to so far, a point we take up below. By contrast, the graduate students and the faculty reported on a wide range of writing tasks for a wide audience and diverse purposes.

What further distinguished the groups from one another were their responses to which of these kinds of writing they thought was most important and their reasons for their answers. Table 6 below lists the kinds of writing the participants named as most important.

Table 6: Summary of Types of Writing Listed as Important

	Fr.	Th.	Gr.	Fac.	Total
A. Research	4	7	7	6	24
B. Theoretical	4	1	4	3	12
C. Pedagogical	--	1	1	1	3
D. Professional	--	1	1	--	2
E. Popular	3	1	1	--	5

By far the most frequent answer to this question was the research article or report, followed by theoretical writing. Whereas faculty, on the whole, restricted their answers to research, theory, and pedagogy, third-year students and graduate students mentioned all types of writing. The first-year students were about evenly divided in their responses between research, theory and popular writing. Interestingly enough, more first-year students than any other group pointed to popular writing as the most important. No faculty chose this category, and only one graduate student mentioned it. In fact, one grad student disparaged this type of writing, saying, "Self-help books are garbage, as are most books intended for the general public. Most are actually not written by psychologists. Even the ones that are, are often full of inaccuracies and may hurt people more than help them." At the other end of the spectrum, another graduate student commented on how important she felt it was to inform and reach the public.

When asked to explain why the kind of writing listed was important, several respondents made the sophisticated observation that the importance depends on the audience and purpose of the piece. For example, one faculty member answered: "Important for what? For getting tenure and for scientific reputation, journal articles are most important, and monographs next most important. For making money, textbooks and tradebooks are more important. For having your mother and her friends see your name in print, popular magazines are the way to go." A graduate student similarly responded: "Most important to whom? The writer, the patient, the field?" Clearly, a different kind of writing would be important to each different audience. Given the kinds of writing that faculty and graduate students point to and the reasons they give, both of these groups seem to favor writing that is meant for other members of their academic discipline. The undergraduates and the third-year students seem to point to a wider audience for more diverse reasons. See Table 7 below for a summary of the reasons given for the importance of the writing.

Table 7: Summary of Reasons Given for Importance of Writing

	Fr.	Th.	Gr.	Fac.	Total
1. Contribution to Knowledge	3	5	8	7	23
2. Educate within Discipline	1	1	--	--	2
3. Educate General Public	3	1	1	--	4
4. Outlet for Writer	1	1	--	--	2
5. Personally Interesting	2	--	--	--	2
6. Tenure & Promotion	--	--	1	--	1
7. Depends on Purpose & Audience	--	1	4	2	7

The most common response to the question of why a particular kind of writing was important was that it contributed to knowledge in the discipline. Indeed, apart from the observation that the importance depends on the writer's purpose and the audience, all but two of the faculty stated that contribution to knowledge was what made the kind of writing important. Eight of the ten graduate students gave similar responses, but one argued that the general public would benefit from being educated, and another pointed to the publishing requirement for tenure and promotion. By contrast, the undergraduates seemed more divided in their responses. While half of the third-year students cited "contribution to knowledge" as a reason, only three first-year students pointed to this. Three other first-year students cited the role psychology writing can play in educating the public, and two pointed to personal reasons (e.g., they found that kind of writing more interesting than other kinds.). Finally, both a first-year student and a third-year student noted a reason that can best be described as "outlet for the writer." The former suggested that explanatory writing gave the writer a chance to express his/her views; and the latter suggested that proposals and research papers were important for getting acknowledged in the field.

Past experiences with writing: Another way to consider the differences among the groups is to examine the kinds of experiences they report having had with writing in psychology. As might be expected, Table 8 shows that graduate students reported having written in many more different genres than did either the third-year students or first-year students. First-year students reported that they have primarily written academic research papers. Third-year students reported having more varied experience in writing in the discipline; in addition to academic research papers, they also reported writing empirical research reports, clinical reports, literature reviews, and research proposals. Graduate students reported having written in almost all genres except the clinical report. (Since none are studying clinical psychology, they would have no occasion to write in this genre.) Furthermore, graduate students and third-year students tended to answer this question by naming genres whereas first-year students tended to cite the topics they wrote on. For example, one first-year student wrote, "I have written a paper on issues of co-dependency in chemically dependent families." Another first-year student simply listed the titles of four papers she had written. What this suggests to us is that first-year students may view writing in monolithic terms because their experiences so far have been with primarily one kind of writing. Part of becoming a member of a discipline involves becoming sensitive to and experienced with the types of writing demanded by the discipline. The responses here indicate that this varied experience does not happen in the first-year.

Table 8: Kinds of Writing Students Report Doing

	Fr.	Th.	Gr.
Research Paper	10	9	8
Empirical Research Report	1	8	8
Theoretical Paper	--	--	4
Clinical Report	2	1	--
Literature Review	--	2	6
Summaries	--	--	2
Book Review	--	--	2
Research proposal	--	4	3
Conference Paper	--	--	8
Conference Poster	--	--	2
Research and/or Travel Grant	--	--	2
Instructor's manual	--	--	1
Dissertation	--	--	2
CV	--	--	1

Having examined how these four groups *read* psychology texts and their experiences with *writing* psychology texts, we were interested in how they viewed *authorship* and *authority* in the discipline.

How do first-year students, third-year students, graduate students and professors compare in their concepts of authorship and authority in their discipline?

When asked how important authoring is in the professional lives of psychologist, all four groups were unanimous in reporting that it is important. However, the reasons each group gave for its importance varied in some subtle ways. Most of the first-year students (7 out of 10) explained that writing was important for psychologists to communicate and share their findings. One student pointed out that writing can serve an epistemic function: "It makes them [psychologists] explore other options/ opinions. It helps in researching by making them put into words what they have learned. Sometimes you understand and learn about things ideas that never even crossed your mind just because you are talking or writing it out and bringing it to the forefront of your mind." Two other first-year students suggested that writing was important because of the institutional pressures of "publish or perish." Third-year students reported that authoring was important for a slightly more complex range of reasons, from communicating ideas and findings, to contributing to knowledge, to institutional requirements, and to testing ideas (e.g., "so that others may critique, agree, replicate or be won over by the claims made through research." Graduate students reported a similar range of reasons. One of the graduate students best captured the range of answers when he wrote: "Very, very important because: 1) main means of communication, 2) basis of evaluation for job status and grant acceptance, and 3) useful for clarifying one's own thoughts to oneself." Finally, like the students, the professors mentioned several reasons for why authoring is so important, including communication, institutional requirements, and subjecting ideas "to critical scrutiny."

The role of writing assignments in psychology courses. Although the fours groups of participants were in agreement over the importance of authoring in psychology and they reported similar, overlapping reasons for its importance, they

varied in some important, though, subtle ways in how the viewed the role of writing in psychology classes. As Table 9 below demonstrates, the four groups reported a similar range of reasons for why writing is assigned (e.g., epistemic, apprenticeship, skillsmanship, testing, and critical thinking) but a close look at the table illustrates that these groups vary in the number of reasons they give and the kinds of reasons they emphasize.

Table 9: Reasons Professors Assign Writing

	Fr.	Th.	Gr.	Fac.	Total
Apprenticeship	2	4	7	5	18
Skillsmanship	1	4	6	3	14
Epistemic	4	3	3	2	12
Critical thinking	2	--	4	4	10
Testing	2	2	3	2	9

For example, first-year and third-year students tended to emphasize the epistemic function of writing (e.g., writing builds knowledge), whereas faculty and graduate students put more emphasis on the apprenticeship role of writing (e.g., writing prepares students to become contributing members in the profession of psychology), and on critical thinking (e.g., writing builds critical thinking ability). Half of the graduate students and nearly half of the third-year students mentioned that writing assignments provide practice which helps improve writing skills; this was also mentioned by three professors but only by one first-year student. Moreover, undergraduates tended to provide a solitary reason for why writing was assigned, whereas graduate students and faculty were more likely to report multiple reasons for assigning writing. In sum, faculty and graduate students appeared to have a more complex or complicated vision of the function of assigning writing than did the undergraduate students.

Sources of authority. The participants varied greatly when asked to explain what gives psychologists the *authority* to make statements about psychology. As Table 10 below shows, both groups of undergraduates tended to locate *authority* within the psychologist, most often crediting his or her knowledge and experience. By contrast, graduate students and faculty were equally divided between locating authority within and outside the psychologist. That is, in addition to knowledge and experience, these two groups also pointed to reliable empirical evidence, sound research, quality of presentation, and journal editors and peer reviewers as sources of *authority*. In short, the graduate students and faculty provided a much more complicated view of authority than did the undergraduates. One possible explanation for these differences is that the undergraduates are still in the process of building knowledge and experience, and thus, these two may be more salient. Another reason may be that they are not as aware of the role that these other sources play, for as the sections above demonstrate, they have had less experience with reading and writing in the discipline than have graduate students and faculty.

Table 10: Sources of Authority

	Fr.	Th.	Gr.	Fac.	Total
Internal Sources					
Knowledge	8	4	8	6	26
Experience	3	2	3	2	10
Analytical Mind	--	--	--	2	2
Dedication to/interest in Field	1	--	1	--	2
External Sources					
Reliable data & empirical evidence	1	2	4	3	10
Statistics	--	--	1	1	2
Quality of Research	--	--	1	1	2
Presentation of empirical evidence	--	--	--	1	1
Journal editors/peer review system	--	--	1	1	2
Institutional Affiliation	1	--	--	--	1
Reputation of psychologist	1	2	2	1	6

This study supports and provides complementary evidence to the longitudinal study we conducted on writing in psychology (Spivey, Mathison, & Greene, 1991). First, it indicated the interrelationship between discourse knowledge and disciplinary knowledge. That is, it suggests that as student become more steeped in the discipline, they become more attuned to the various kinds of discourse that operate within the discipline. The fact that all four groups were most alike in their descriptions and graphic representations of the discipline suggests that they share some knowlege about the discipline; but that they are so diverse in their responses to questions concerning authoring suggests that students have a great deal to learn about the discourse. This process of learning the disourse, however, ought to help them build a richer understanding of the discipline. That is, discourse and discipline are not separate. As one professor elegantly pointed out, "The communication of knowledge to the public 'blackboard' is as essential a part of the work of science as the creation of that knowledge. The two cannot be separated." (P-12). Here the intricate interrelationship between discourse and discipline is well articulated. Second, this study suggests that students learn discipline and disciplinary discourse through a long apprenticeship, one that permits them to experience the various genres that are used to reach for various purposes and audiences in the discipline. The students appear to move from a monolithic view of discourse--academic writing is all one genre--to an increasing sense of the various possible forms academic writing can take within a discipline.

As Kaufer and Carley (1993) have recently argued, one of the elements that separates academic discourse from other kinds of professional discourse is the unspoken mandate that disciplinary discourse expand the culture. Learning how to contribute to knowledge in a discipline, however, is a complex task that requires one not only understand what the content of the discipline is in order to understand what is and what is not a contribution but also one must understand what kinds of conventions are accepted and appropriate.

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Appendix A

FORM USED FOR DISCIPLINARY MAPS

Name: _____
Date: _____

Draw a sketch (map, tree, diagram, etc.) of how you perceive the organization of the discipline of pspychology.

1992 QUESTIONS REGARDING MAPS

1. Go back to the disciplinary map you have drawn. As you did in past years, we would like you to walk us through it, so to speak. That means that we would like you to explain what you did (the parts and the whole).

2. Tell us where you would locate yourself in your sketch. Please describe why you have placed yourself in this position.

3. Please review your maps of previous years. In what ways have your maps changed over the years? How might you account for changes in your maps over the years?

1991 INTERVIEW

I. Discourse of Psychology

1. On our questionnaires over the years, we've asked you about the types of writing that psychologists do. You've mentioned *(supply the student's reponses)*.
Can you think of others?
Of these types of writing, which do you think is most important to psychology? Why?

2. One form of writing that psychologists produce is the research report (an article in which the researcher reports a study). What goes into such an article? Why is it necessary to have these elements?
Why do you think this type of writing is such a prominent one in psychology?

3. We've asked you what can convince you about the accuracy of a particular finding.On the last questionnaire you said (*show what they said*)
We also asked you how psychologists support the claims they make in their writing, and you said (*show what they said*).
What does that mean about the status of knowledge in psychology?
If you are right, what responsibilities do writers of psychology articles have?
What responsibilities do the readers of psychology articles have?

4. How do writers through their texts, particularly research articles, influence the nature of knowledge in psychology?

5. What role does writing play in the professional lives of psychologists? For academic psychologists what does it mean to "publish or perish"?

6. University faculty teaching psychology courses often use writing assignments in their classes. Over the course of your undergraduate career, for example, you've produced a number of psych papers.
What reasons can you think of for why professors (instructors) have students do writing for their psychology classes?
Do you see any relationship between the writing that students do in psychology courses and the writing that psychologists do in their discipline?

II. Specific Questions on the Student's Papers

III. Student's Position in the Discipline

1. How have you changed as a psychologist over the past four years?

   a. What has influenced these changes?
   b. Of all of these changes, which has been the most dramatic? Please elaborate.
   c. How do you feel about yourself now as a psychologist? Your strengths and weaknesses, contributions?
   d. How has your approach to reading of psychology texts changed over the course of the past four years?
   e. How has your approach to the writing of psychology texts changed over the course of the past four years?
   f. How do you think your approach to reading might change in the future?

Your approach to writing?

2. Where do you see yourself in the future; in one year, in five years, in ten years?

    a. In what ways do you think you will grow as a psychologist in graduate school?
    b. After graduate school, how do you think your work will fit into/contribute to psychology?
    c. ('**no-grad school**') What will your relationship to psychology be? Do you see yourself using what you have learned in psychology?

3. ('Grad school') What kinds of reading do you see yourself doing in graduate school courses and projects?

4. ('Grad school') What kinds of writing do you see yourself doing in graduate school courses and projects?

IV. The CMU Context

1. Are there faculty members who have influenced you? In what ways?

2. Which particular courses have influenced you the most? In what ways?

3. Are there opportunities--for example, internships, clubs, etc.--that have been influential? In what ways?

4. ('Grad school') How have graduate schools responded to you as a graduate of CMU?

V. The New Context

1. Which graduate schools did you consider? Why?

2. What is their program of study like?. Where do you see yourself fitting into that program?

3. Are there any particular faculty members with whom you would like to study or work? What do you think will be gained from these contacts?

4. Are there any particular courses you want to take?

VI. Other

These are the questions I had. Is there anything else you would like to add?

QUESTIONS ON 1992 QUESTIONNAIRE

1. Is psychology related to your career goals?

2. How committed are you to the career you indicated above?

3. If you change careers, what will you probably change to?

4. a. What graduate courses have you taken this academic year? Of these courses, which ones have had the greatest influence on you? In what way?

4. b. Are there any seminars other than those related to coursework that have been important to you? If so, in what way have they been important?

5. If you are not currently in a graduate program in psychology, please answer the following:
a. Describe your scholarly or academic activities this year.
b. How have you used your knowledge of psychology in your current pursuits, academic or otherwise?

6. Please list and describe the research projects in which you've been involved this year. (These may include projects related to course work or projects that are work related or personally motivated). Include what your role has been in these projects.

Course-related projects

Work-related projects (Please include the type of funding and the principal investgator.)

Personally-motivated projects

7. University faculty teaching psychology courses often use writing assignments in their classes. Over the course of your undergraduate career, you have produced a number of papers. Have you taken a psychology course for your graduate program? If so, given the written assignments, you may have completed for the psychology course/s in your graduate career thus far,

a. How would you compare the types of writing assigned at the two different levels (graduate and undergraduate)?

b. Do you think professors have different criteria for grading at the undergraduate and graduate levels?

8. On our questionnaires over the years, we've asked you about the types of writing that psychologists do. We would like you to answer the following questions:

a. Are there any new types of *psychology* writing that you have been exposed to where you are now that you weren't exposed to while you were an undergraduate at CMU?

b. If yes, of these new types of writing, which do you think is most important to psychology? Why?

9. What makes particular information, ideas, or claims convincing to you in psychology?

10. What responsibilities do writers of psychology articles have?

11. What responsibilities do the readers of psychology articles have?

12. How have you changed as a psychologist over this past year?

Appendix B

QUESTIONS ON UNDERGRADUATE QUESTIONNAIRE

1. When did you decide on psychology as your undergraduate major?

2. Why are you majoring (or planning to major) in psychology?

3. How committed are you to psychology as your undergraduate major?

___ 100% committed
___ 90% committed
___ 75% committed
___ 50% committed
___ greater than 50% chance that I'll change majors

4. If you change majors, what will you probably change to?

5. Did you come to CMU to study psychology? Was there something about the Psychology Department here that attracted you to CMU?

6. What areas of psychology appeal most to you? Why?

7. How are you planning to apply your knowledge of psychology after you complete your studies?

8. What kind of psychologist are you thinking about becoming (if you are thinking about becoming a psychologist?

9. Do you plan to go to graduate school?

10. What psychology courses have you taken? Please indicate when you took them.

11. What courses have you taken on subjects that are closely related to psychology?

12. What is *psychology*?

13. People in academic disciplines, such as psychology, sometimes reflect on the nature of their particular discipline. Even at this point in your academic career, you too can contribute to this discussion. What is the nature of the discipline you are considering for your major? What makes it unified and what makes it unique from other disciplines?

14. What sorts of writing do psychologists do?

15. Of these types of writing, which do you consider most important? Explain why.

16. How can a psychologist convince you as a reader about particular information, ideas, or claims that he or she makes in a piece of writing?

17. How do psychologists support the claims that they make in their writing?

18. What gives psychologists the authority to make statements about psychology?

19. Of what importance is writing in the professional lives of psychologists?

20. What kinds of papers have you written thus far in your psychology classes?

21. University faculty teaching psychology courses often use writing assignments in their classes. What reasons can you think of for why professors (or instructors) have students do writing in the psychology classes?

22. How important has the APA manual been to you? Has it influenced your writing? If so, in what ways?

23. In the space below, please draw a sketch (a map, tree, diagram, etc.) of how you perceive the organization of the discipline of psychology.

24. Go back to the disciplinary sketch you have just drawn. Please explain what you did in drawing the map. For example, please explain how parts of the map relate to the whole. Also explain why you chose the kind of sketch you did to portray the discipline of psychology. In other words, please walk us through the sketch, so to speak, so that we may understand how you drew it and why you drew it in the way you did.

25. Again, look at the disciplinary sketch you just drew, and explain where you would locate yourself in your sketch. Please explain why you have placed yourself in this position.

QUESTIONS ON GRADUATE-STUDENT QUESTIONNAIRE

1. When did you decide on psychology as a field?

2. Why did you decide on the field of psychology?

3. How committed are you to psychology as your field for a career?

___ 100% committed
___ 90% committed
___ 75% committed
___ 50% committed
___ greater than 50% chance that I'll change fields

4. If you were to change fields, what would you probably change to?

5. Why did you choose to come to CMU to study psychology? Was there something about the Psychology Department here that attracted you to CMU?

6. Before coming to CMU, had you done any graduate work in psychology? If so, what kind of work, where and when?

7. What areas of psychology appeal most to you? Why?

8. How are you planning to apply your knowledge of psychology after you complete your graduate studies?

9. What kind of psychologist are you thinking about becoming (if you are thinking about becoming a psychologist)?

10. Did you major in psychology as an undergraduate? If yes, how many courses did you take in psychology as an undergraduate? If not, what was your major?

11.a. What graduate psychology courses have you taken?

11.b. What other courses have you taken on subjects (in disciplines) that are closely related to psychology?

12. What is *psychology*?

13. People in academic disciplines, such as psychology, sometimes reflect on the nature of their particular discipline. What is the nature of the discipline of psychology? What makes it unified and what makes it unique from other disciplines?

14. What sorts of writing do psychologists do?

15. Of these types of writing, which do you consider most important? Explain why.

16. How can a psychologist convince you as a reader about particular information, ideas, or claims that he or she makes in a piece of writing?

17. How do psychologists support the claims that they make in their writing?

18. What gives psychologists the authority to make statements about psychology?

19. Of what importance is writing in the professional lives of psychologists?

20. What kinds of papers have you written thus far in your graduate program? Please note which have been papers for courses, which for research projects, and which for other outlets (e.g., conference papers or journal articles).

21. University faculty teaching psychology courses often use writing assignments in their classes. What reasons can you think of for why professors have students do writing in the psychology classes?

22. How important has the APA manual been to you? Has it influenced your writing? If so, in what ways?

23. In the space below, please draw a sketch (a map, tree, diagram, etc.) of how you perceive the organization of the discipline of psychology.

24. Go back to the disciplinary sketch you have just drawn. Please explain what you did in drawing the map. For example, please explain how parts of the map relate to the whole. Also explain why you chose the kind of sketch you did to portray the discipline of psychology. In other words, please walk us through the sketch, so to speak, so that we may understand how you drew it and why you drew it in the way you did.

25. Again, look at the disciplinary sketch you just drew, and explain where you would locate yourself in your sketch. Please explain why you have placed yourself in this position.

QUESTIONS ON FACULTY QUESTIONNAIRE

1. When did you decide on psychology as a field?

2. Why did you decide on the field of psychology?

3. Where and when did you do your graduate work in psychology?

4. What was the focus of your graduate work?

5. How long have you been at CMU?

6. Why did you choose to take a position at CMU? Was there something about the Psychology Department here that attracted you to CMU?

7. What areas of psychology appeal most to you? Why?

8. What kind of psychologist would you say you are? Please describe the kind of psychologist you are.

9. What label would you use for your own area of psychology? What differentiates it from other areas in psychology?

10. What is *psychology*?

11. What is the nature of the *discipline* of psychology? What makes it unified and makes it unique from other disicplines?

12. What sorts of writing do psychologists do?

13. Of these types of writing which do you consider most important? Explain why.

14. How can another psychologist convince you as a reader about the value of particular information, ideas, or claims that he or she makes in a piece of writing?

15. How do psychologists support the claims they make in their writing?

16. What gives psychologists the *authority* to make statements about psychology?

17. Of what importance is writing in the professional lives of psychologists?

18. How important has the APA manual been to you? Has it influenced your writing? If so, in what ways?

19. Have you noticed a change since you began in the field in the *kinds* of writing or in the *conventions* for writing in psychology? If so, please explain.

20. What undergraduate and graduate psychology courses do you teach?

21. If you assign writing for your courses, please explain your reasons for having undergraduate and graduate students write in your courses.

22. On a separate sheet of paper, please draw a sketch (a map, tree, diagram, etc.) of how you perceive the organization of the discipline of psychology.

23. Go back to the disciplinary sketch you have just drawn. Please explain what you did in drawing the map. For example, please explain how parts of the map relate to the whole. Also explain why you chose the kind of sketch you did to portray the discipline of psychology. In other words, please walk us through the sketch, so to speak, so that we may understand how you drew it and why you drew it in the way you did.

24. Again, look at the disciplinary sketch you just drew, and explain where you would locate yourself in your sketch. Please explain why you have placed yourself in this position.